COLE'S
ESSAY
ON
APOPLEXY

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A

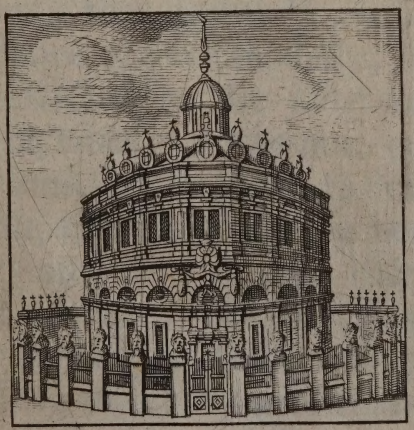
PHYSICO-MEDICAL *ESSAY*

Concerning the late frequency of APOPLEXIES.

Together with a general Method of their Prevention, and Cure.

In a Letter to a Physitian.

By *WILLIAM COLE*, M.D.



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To my much esteemed Friend
Samuel Kimberley,
Dr. in Physick.

Dear Sir.

THough I must look on your requeſt, to have my thoughts of the cauſe of the greater *frequency of Apoplexies* theſe late years, than formerly, as only an inſtance of your modeſty, in giving a deference to the judgment of others, when, I doubt not, your own notions, if you pleaſe to draw them forth, can better ſatisfy both your ſelf, and all men elſe, then any I can produce; yet that I may not be wanting to the friendſhip I have ſo long in reality profeſſed for you,

I ſhall for once venture to preſent them to you, however unaccurate; which, being addreſſed to a friend, may expect to be candidly interpreted, although they bring not the ſatisfaction you expect.

'Tis true; I have heard the ὄνομα queſtioned; it being alledged that this diſtemper might, amongſt the vulgar, be ranked under ſome other claſſe, in regard 'tis not to be preſumed they ſhould know to aſſigne the right names to diſeaſes; till the fate of a Great Prince, our late moſt gracious Soveraigne, commonly reported to have dyed of it, might give a general notion of the name, as well as imprint apprehenſions of the danger. And indeed it may be ſuggeſted, that ſuch an accident, happening to ſo great a perſon, may make ſtronger impreſſions on mens minds, than when it falls on thoſe who

who make a leſſer figure, and thence make them take notice of what they would not otherwiſe have heeded. Beſides that the report muſt, on that account, be the more diffuſive; and ſo being conveighed amongſt many of all tempers, muſt meet with ſome of very apprehenſive ones, whoſe fears will eaſily be propagated to others; it being natural to all men to reflect upon what they think carries danger, (eſpecially when 'tis ſtrongly and frequently inculcated) in order to prevent it, if not to have their ſpirits depreſſed by it, from whence perhaps ſuch may be more diſpoſed to receive the *Idea's* (to ſpeak in the language of *Helmont*) of ſuch a diſeaſe.

But if we duly conſider it, we may find, that it hath been both known by Name, and dreaded by

thoſe of all Ages. For beſides that all practical Authors (from whom the vulgar muſt be preſumed to have firſt received it) treat of it *ex profeſſo* by that Name, the very ſurprize muſt neceſſarily excite a notion of it in all, it being ſo very different in its ſymptoms and fatality from all other diſtempers. So that the many accounts continually brought of great perſons, as well as thoſe of a lower rank, that have been ſnatched away by it, are not to be looked upon as only the true notion of it retrived, which was before miſtaken, but a real increaſe of it now; and may too much juſtify the melancholy apprehenſions of the *Gentlemen* you ſpoke off, who deſire an information concerning it.

To endeavour then to give a ſatisfactory anſwer to your queſtion, 'twil be requiſite I conſider, though briefly,

briefly, the particular *Seat*, *Nature*, and immediate *Cauſes* of the diſtemper, as alſo the *Diſpoſition of the Part*, where 'tis ſeated, to be affected. And though this diſquiſition have been ſo often and learnedly made by many Authors, yet moſt of them differing from others in ſome particulars, it may hope your more favourable interpretation, if I do the like from any of them who may perhaps be your favourites, when by their example I ſhew why I do it: ſince as the notions of all cannot be reconciled, ſo no man is obliged to think preciſely with any other, be his reputation ever ſo great.

I propoſe not to my ſelfe to deliver all their opinions (which your own reading ſupplys you with better than I can) much leſs ſolemnly to refute them. But I muſt neceſ-

ſarily touch on ſome particulars in a few of them, in order to make out my own thoughts.

To the *Firſt*, 'Tis agreed by the generality of Phyſitians that the *Brain* is the ſeate of the *Apoplexy*; only *Helmont* places it in the *Præcordia* (as moſt explicitely, *De Lithiaſi*, *Cap.* 9. §. 52, *&* 70.) whoſe offence againſt the *Schooles*, and contempt of *Anatomy* (though otherwiſe he muſt be owned to be a man of great parts and learning) might poſſibly prompt him, in oppoſition to the Antients and their followers, to take up with ſome opinion, that preſented it ſelf with any colour, that might contradict theirs, rather than agree with them even in the moſt obvious and convictive ones, though ever ſo clearly demonſtrable too upon diſſection. For indeed, beſides *Anatomical autopſy*, which

is

is too clear to be contradicted, all the *Symptoms* argue it to be ſeated in the *Braine*. For even in the moſt ſodain ſeyſure, when the perſons affected have not time allowed them to declare their perceptions, 'tis evident that the ſtroke is impreſſed on the animal faculty in general, by the immediate ceſſation of its functions, the vital (ſo called) continuing, for the moſt part, entire for ſome time; which muſt argue the cauſe to reſide about the original of it, the *Brain*, ſince from thence only that faileur can ſo generally be effected. But when it begins with leſs violence, ſo that there is any interval betwixt its invaſion, and the total defection of the animal functions, they generally complain of, either a *vertigo*, or a great oppreſſion and paine in the head; upon which preſently follow ſtupid-

ſtupidneſs, ſomnolency, dazling of the eyes, a relaxation of all parts of the body, and the like: all which are ſo evidently deducible from the conſideration of the nerves affected at their original, that twere time loſt farther to prove it.

But ſince 'tis not ſatisfactory enough to aſſert in general, that the *Braine* (which is an accurately organized part, in which there is a great variety of cels and veſſels, and a conſiderable difformity of parts one from another) is the ſeate of this diſtemper, without determining whether *the whole*, or any *particular region*, or part, of it be eſpecially affected, Authors have employed themſelves in this ſearch.

The moſt celebrated opinion, and which moſt have followed till this Age, was that of *Galen*, who aſſigned the *Ventricles* for the particular

Seate,

Seate, and ſuppoſed a *viſcous matter* got into them to be the cauſe of it. This opinion, though it might give ſome account of the interception of the animal ſpirits, which (according to the antient doctrine are to actuate the body by being diſtributed along the nerves, on the account of the compreſſion theſe muſt ſo undergo near their original, which diſtribution failing, all animal motion, in the parts influenced by the nerves which labour under this compreſſion, muſt ceaſe; yet (with all deference to the memory of *the great Author*, as well as to the abbettors of it) I conceive, may rather be preſumed to ſuggeſt a reaſon of a *Palſey*, than *Apoplexy*, and can hardly be made out to be the cauſe of ſo ſodaine a ſeiſure; ſince ſuch a congeſtion muſt be ſlow, and ſo the effect generally muſt come gra-

gradually: whereas from a perfect ſtate of health the *Apoplexy* on a ſodaine (as the name imports) ordinarily ſeizes. Beſides though the paſſages of the ſpinal marrow, and nerves thence ariſing be thus *cloſed* (rather than *obſtructed*; an obſtruction being generally, I conceive, in the common acception of the word, underſtood to be from ſome matter within their tracts, and not properly from it externally compreſſing them) whereby the ſpirits cannot readily deſcend into them; yet their motion in the *Brain* may poſſibly for ſome time be free enough; and conſequently the Soules exerciſe may be then entire for a while, if not indeed exalted from the confinement thoſe have to the *Brain* in that caſe: and 'tis obſerved many times that, in a *Hydrocephalus*, Intellection, and other animal facul-

ties

ties fail only gradually, though the Ventricles have been found upon diſſection to have been much filled; which they muſt have been long time a doing. Withal, what is once got into the Ventricles has no farther communication with the animal ſpirits, being diſterminated from the *Brain* by the interpoſition of the membranes. But *Galen* ſeems not very conſiſtent to himſelf in this notion, as making the *Brain* it ſelf (*De loc. affectis lib.* 3. *cap.* 10.) to be the ſeate of it, without there mentioning the Ventricles, whereas before (*cap.* 7. as well as in other places) he only ſeated it in theſe, excluſively to the ſubſtance of the *Brain.*

But that *Hypotheſis* is now antiquated, and the *ſubſtance of the Brain*, generally owned to be the *ſeate* of it, Anatomical obſervations having,

having, as I ſaid, made it apparent it muſt be ſeated there. And tho' ſeveral Authors have diverſly explicated it, yet there are two opinions particularly which are now adayes moſt celebrated, and perhaps deſerve to be ſo, both on their own account, as being each of them very ſpecious, though ſomwhat different from each other, as alſo of their Authors, the famous *Wepfer* and *Willis*. Theſe indeed ſeem to agree in their notion of the particular ſeate of it, *viz.* both of them aſſigning the *Medullar ſubſtance* of the *Brain* and *Cerebellum* for it. But they differ here in that the *former* conſiders the whole compage of them both under that name, in contradiſtinction only to the Ventricles; the now received diſtinction into *Cortical* and *Medullar* (more properly ſo called) having not been then

then thought on; and therefore he ſeems to ſuppoſe *any part* of the *ſubſtance* may be the *ſeate*: whereas the *latter* ſuppoſes it to be in the *corpus calloſum*, or true *Medullar* part according to that diſtinction; but withal he aſſerts that the morbifick matter is tranſmitted to it through the *Ambitus* or *Cortical*; the Arteries (which are the conduits for conveighing it, whatſoever it be, either immediately, or mediately) paſſing all through it. But they differ in their explication of the *mode* of production. For *Wepfer* ſuppoſes that the *Brain* is either denied a ſufficient afflux of bloud, of which he aſſignes ſeveral cauſes; or if it have that, yet that the diſtribution of the ſpirits into the nerves is hindred either by an *obſtruction* of them at their originals, or their *compreſſion*. But *Willis*

lis doubts whether the former of these, the want of a supply of bloud, can have place here, since 'tis known there are every where about the *Brain* (as well as in other parts of the body) mutual *Inosculations* of the arteries, on the account of which 'tis not to be supposed that all the branches of the *Carotides* and *Vertebral* can on a sodain be obstructed, but that if some happen to be so, yet all parts of the *Brain* must receive the bloud quickly enough from those which are free, by means of these *Anastomoses*, and so the nerves may be readily enough supplyed; or if these arteries chance to be totally obstructed, he thinks the consequent distemper will not be properly an *Apoplexy*, but a *Lipothymy*, or *Hysterical affect*. From which consideration he deduces, that what makes an *Apoplexy* must be

be ſomthing in the *Brain* it ſelf, that cauſes either a *ſolution of continuity* in it, or *inſinuates* it ſelf into the *Meditullium Cerebri*, or *original of the nerves*, and there either *obſtructs* the paſſage of the ſpirits into them, or elſe on the account of ſome narcotick, or other diſagreeable quality, *diſſipates* or *depreſſes* them. Both theſe notions may with much greater advantage be had from the learned Authors, than a ſhort abſtract; for which too, under this head, I ſhould apologize, this relating to the *Cauſe*, but that withal it conduces to determine the *Seate*.

But though Dr. *Willis* have ſo ſpecioufly urged againſt that tenent, of the *non-admiſſion of bloud* to the *Brain*, to produce an *Apoplexy*, yet I ſuppoſe that (with all deference to his great judgment) his opinion, that

that the proper *Medullar* part of it is the *only*, or at leaſt *moſt frequent*, ſeate of it, is ſomwhat too contracted, not to ſay precarious; and that on the other ſide, though an *Apoplexy* may perhaps ſomtimes begin in the *corpus calloſum*, yet rather and much more frequently, in the *Cortical* than there, or amongſt the nerves at their original. For though 'tis probable the *Meditullium cerebri* is the place where the ſoule principally acts, and from whence ſhe diſpences her influence to the reſt of the body, and therefore ſhe cannot be ſaid to be diſturbed in her actings, and ſo a diſtemper be introduced, till that part be diſaffected; yet I conceive that part is properly to be reckoned the *Seate* of a diſtemper, where the *Cauſe* that influentially occaſions the defection of natures due actings, firſt fixes it ſelf:

ſelf: otherwiſe I ſee no reaſon but that *Wepfers denegation of ſpirits*, which *Willis* oppugnes, might be ſufficient both to *make*, and *denominate*, an *Apoplexy*. And indeed that the *Cortical* is moſt apt to receive the morbifick matter, ſeems obvious from hence, that in it the arteries are moſt numerous, and it moſt lax and yielding; ſo that when from any occaſion the bloud is apt to *get out of*, or, at leaſt *diſtend*, its veſſels, or indeed but to *exude* out of them, 'tis probable this may be done more eaſily *here*, than in the *corpus calloſum*. 'Tis true, it muſt be granted that the arteries are diſſeminated through all parts of it, even to the inmoſt; otherwiſe they could neither receive due heat nor nouriſhment (if at leaſt nouriſhment come immediately from the bloud to any parts but the roots

of the Nerval tree, numerouſly diſperſed through the cortex) which veſſels though penetrating ever ſo deep, if they chance either to *open*, be *broken*, or become *relaxed*, whereby they may let go ſome of the ſubſtances they carry (after the manner by and by to be alledged) 'tis obvious muſt ſoon ſupply the matter of a conſiderable inundation (if I may ſo call it) of the bloud, or thoſe ſubſtances of it which are apt to ſecede, upon theſe parts of the *Brain* to which they reach, from the impetuous protruſion from the heart: and the veſſels being here tendereſt (as all veſſels not only are at their extremities, but eſpecially when they runn deepeſt, and proportionally fartheſt, becauſe then they are ſmalleſt) 'tis no wonder that a congeſtion ſhould ſoon be made where this is. But yet if we con-

conſider their comparatively ſmall number to thoſe in the *Cortical*, and how they muſt be better fenced and ſupported by their being diſtributed through a more compact ſubſtance as the *corpus calloſum* is, there ſeems leſs danger of either a *congeſtion*, or *extravaſation*, in this region; the ſtrength of the tone of any part mainly conducing to the ready tranſmiſſion of the perluent liquor. And that this happens moſt uſually in the *cortical region*, three, of the four inſtances alledged by *Wepfer*, ſeem to evince; in which I conceive it is eaſy to gather that they were the *extime* parts of the *Brain* that were *moſt* diſaffected, and therefore there ſeems reaſon to ſuppoſe muſt be *primarily* ſo. But from hence.

Secondly, The *Nature* of the diſtemper may be deduced. And it ſeems to me probable, that it con-

ſiſts indeed in the *defect* of that matter, which ſhould be ſupplyed to the nerves for the exerciſe of the animal functions, but occaſioned from the *vitiated organization* of the parts and veſſels of the *Brain*, from whence a due ſecretion (which I have heretofore [*Tr. de ſecretione animali*] endeavoured to make probable to be here performed by a *ſimple colature* in the *Cortical glandules*) of the nervous liquor out of the bloud cannot be made, but that, either from the foremen-tioned diſtention of the ſanguiferous veſſels, the ſecretory ducts cannot readily admit the matter to be ſe-parated; the confuſion of the maſſe, emergent upon ſuch a congeſtion, prohibiting a regular ſeceſſion; or elſe the groſſer ſubſtance of the bloud, not moved as 'twas wont, being brought to the beginnings of the

the nerves, muſt needs obſtruct them, and ſo cauſe an immediate ceſſation of motion in all parts below, as well as, by diſturbing the regular motion of the ſpirits in the *Brain*, hinder the exertion, not only of the Intellectual, but alſo ſenſitive faculties.

For though *Intellection* (and poſſibly *Sence*) belong only to the *Soul* as ſuch, which is a ſubſtance diſtinct in it ſelf from the *Body*; yet the exerciſes of it, ſo long as the ſoul continues united to the body, cannot be had but by its mediation: our bodies being very fitly reſembled to *Hydraulick Engines*, whoſe ſtructure diſpoſes them to exhibit a great number of various *phænomena*, when filled with a due liquor, and ſet on work by a mover diſtinct from them (whether within or without 'tis not material) which,

as they, whilſt in order, very regularly perform all the motions their fabrick directs to, ſo if they happen to be either accidentally broken or diſordered in any part, or elſe the liquor they carry comes to be ſo groſs as to obſtruct them, or corroſive, or otherwiſe vitiated, as to make its way through them, muſt either undergo a total loſs of their motion, or at leaſt a very great diſorder in the ſeveral performances that the organical deſign requires. Agreeably to which, the *Bloud* appears to be the *principal liquor* for the motion of this curious engine of our body, as being univerſally and unceſſantly carried through all parts of it. (Not to make a compariſon betwixt *this* and the *Nervous juice*; which though it may be deſigned for more noble, and perhaps much more extenſive proxi-

proximate uſes, than the groſs maſſe of the bloud, yet muſt be owned, on the account of its ſmall quantity, and ſlow motion, to be not fit for this deſign, otherwiſe than to ſpiritualize, and give an inſtinct to that and the Heart that impels it, adde that 'tis made out of the bloud.) Now if through the fault of its pipes, the *arteries* and *veines*, it make its way out of them, it muſt of neceſſity extremely diſaffect the parts in which this happens, eſpecially when they are deſigned for the nobler ſort of uſes. Indeed *Life*, as well from argument̃s of *Reaſon*, as the *Divine Oracles* (which tho' they teach many things above, yet none againſt, *Reaſon*; and I conceive ought to be conſtrued literally when the analogy of reaſon and nature countenances it, though many things in them are owned to be ſpoken

ken according to mens common apprehenſions; holy ſcripture being deſigned not to teach, *Philo*-- but *Theoſophy*) ſeems to conſiſt *originally*, and therefore *principally*, in the *motion of the Bloud*, its firſt *indicia* being from the *punctum ſaliens*; for which therefore ſo exquiſite pipes are made to diſtribute it to all parts of the body, and return it back again to its firſt ſource for reiterated motions, and thoſe ſo adapted to the ſecretory parts, for the ſeparating of ſubſtances from it for ſeveral uſes; that as all vital actions muſt needs be placidly performed whilſt they are thus duly diſpoſed, ſo if any of them happen to be broken or opened (at leaſt in any conſiderable meaſure) whereby this vital ſtream gets forth of its boundaries, that due and regular *motion* thence ceaſing, *Life* muſt too.

But

But this must most effectually come to pass, if this disturbance of the motion of the bloud chance to be in the *Brain*, where the *Soul* sits (by the consent of almost all) inthroned, and from whence she gives laws to all the Body: so that if this her Royal seate happen to be overwhelmed with such a deluge, and her intercourse with the rest of the body, which her Empire over it requires, intercepted, 'tis no wonder she leaves her province and mansion, thus become so unfit for her residence. But I must beg your pardon for these allegorical excursions, which yet the luxuriancy of the subject readily affords.

This fault in the *due Organization* of the *Brain* consists, either in an *Obstruction of the passages*, or a *Solution of the continuity*; either of which may easily occasion any of the

the ſymptoms. For the *former*; 'tis impoſſible but that (ſince there is a neceſſity of a due proportion between the cavity of the veſſels and the liquors, as well here, as in innumerable inſtances every where to be met with, to the performing of regular motions) if any *obſtruction* happen, the *Liquors* muſt either *move more ſparingly* than is requiſite, or be *congeſted* there, or elſe the courſe of them muſt be *diverted* into other channels, and ſo natures deſignation (to be diſcerned by the known effects) muſt be altered: from any of which occaſions, as there muſt happen a defect of ſpirits to actuate the *Brain* and nerves, and that proportionally to the greatneſs of the obſtruction; ſo if this happen ſodainly, and be total, 'tis evident that there muſt follow both a total and ſodaine abolition of the animal

animal functions. In the *latter*, the Bloud, flowing out of its veſſels, muſt, in ſo tender a part as the *Brain*, quickly *overflow* a great part of it, being urged on by the impulſe from the heart; and then 'tis obvious that all the regular motions and ſecretions there, neceſſary to animality, muſt immediately be interrupted; the paſſages deſigned for carrying ſelect ſubſtances being thus both *enlarged* and *filled* with heterogeneous and groſs ones, which make up the much greateſt part of the Bloud. So that hence,

Thirdly, What is called the *Containing cauſe* is eaſy to be collected, *viz.* ſome matter either *diſcharged out of* the ſanguiferous veſſels upon the ſubſtance of the *Brain*; or elſe, *filling* and *diſtending* them, and thence *compreſſing* the ſides of the paſſages in it. This may either be,

1*ſt*,

1*ſt*, the *Bloud* in its whole ſubſtance, whether good, or impure; ſince in either conſtitution it may, if either congeſted in too great quantity, or too impetuouſly moved, get out of its veſſels, or elſe ſo diſtend them, as to produce the mentioned effect. Or, 2*dly*, ſome *Viſcouſe matter*, proceeding from the *Serum* become leſs ſpirituous, whoſe particles therefore are diſpoſed to lay hold one of another, and ſo to grow clammy, and conſequently unapt to paſs along the uſual tracts, but apt to ſtick in the laxer interſtices between the arteries and veins in the habit of the *Brain*; to which more, being continually brought by the continual motion of the Bloud, may by a likeneſs of ſubſtance, ſtill aſſociate it ſelf, till it come to a congeſtion great enough to cauſe ſuch an obſtruction, as may at laſt hinder

der the circulation, or at leaſt the ſeparation of ſuch ſubſtances from the Bloud, as muſt actuate the *Brain* and nerves. From ſuch a cauſe too *Inflammations*, which are ſome of the acuteſt, as well as the moſt frequent ſort of diſtempers that aſſaile us, often ariſe; and 'tis generally to be obſerved that in *pleuriſies, anginas, &c.* the Bloud is exceeding viſcous; which quality in it diſpoſing it to obſtruct, muſt therefore, when that happens, cauſe a congeſtion all about, the Bloud inceſſantly arietating againſt that place, and thence ſoon an inflammation. Or, 3*dly*, a greater collection than uſual of the *fluid Serum* in the Bloud, though not diſpoſed to viſcoſity, but inſtead thereof grown too ſharp, which thence may be very apt to make its way through the paſſages in the habit of the *Brain*, whoſe natural

tural Make might keep out a leſs thin *Serum*, ſuch as belongs to the Bloud duly conſtituted but cannot this, in regard its particles are perhaps become leſs than the *diameter* of the pores of the veſſels 'tis naturally carryed into; or elſe theſe pores may come to be ſo dilated by means of the continual lancinations, that the reſiſtance of their ſides may ſoon come to be overpowered. Or, 4*thly*, *polypous concretions*, (thoſe *infelicia ægri cordis germina*, as *Wepfer* calls them) which have their conſtruction from the fibrous parts of the Bloud, whoſe Make being oblong and ramous, numbers of them may happen to aſſociate in the heart too ſtrictly, and being, when once thus aſſociated, unapt to be diſſolved, muſt make *carneous concretions* there; where being radicated, they may grow to a conſiderable

derable bulk and length, and diffuſe themſelves all along the arteries to a great length: the manner of whoſe production the accurate *Malpighius* (*de polypo cordis*) has very curiouſly deſcribed. Theſe *Wepfer* ſuppoſes may make an *Apoplexy* on a double account, *viz.* either *entire*, or *broken*. The *former way*, by being propagated from the heart up to the entrance of the *Carotides* and *vertebral arteries* into the skull, which veſſels, being extenſive before, let the Bloud paſs by theſe *polypi* up to the *Brain* before they reach thoſe perforations of the skull; but when once they doe that, the arteries being confined by the bones, through which they paſs, muſt be totally ſtopped by them; and ſo the Bloud being prohibited from coming to the *Brain*, an *Apoplexy* muſt according to him, follow.

Which

Which ſuppoſition indeed, if it could be demonſtrated, would prove the greateſt inſtance of his aſſertion, that *Apoplexy* may proceed from a *denegation of Bloud* to the *Brain*. But, beſides that 'tis hard to conceive all theſe four arteries ſhould be ſtopped at once by this cauſe (which if they be not, the Bloud coming by any one will be diffuſed by means of the *Anaſtomoſes* all over the *Brain*, for the continuance at leaſt of the animal actions, though perhaps in ſomewhat a lower degree) it ſeems moreover probable, that this ſhould rather be ranked under the claſs of *Cardiacal Syncope's*, whoſe ſymptoms are very like thoſe of an *Apoplexy*: and ſo many and large *polypi*, as muſt effect this, would in likelyhood kill, by hindring the Circulation through the heart, before they could grow

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to the length and bigneſs requiſite to cauſe this obſtruction.[x] But the *other way* by which he ſuppoſes an obſtruction from them may come, is the *breaking* of them off being grown fracid; which happening, the courſe of the Bloud muſt carry them on into thoſe narrower paſſages; whereby it might be preſumed there would follow ſuch a ſodaine obſtruction as muſt produce an irremediable *Apoplexy*, did not his inſtance of *James Knoll* evince the contrary; who, though the arteries in his *Brain* were full of them, yet had never any touch of an *Apoplexy:* unleſs we ſhould ſuppoſe thoſe were not true *polypi*, which, as I ſaid, are generally of a carneous nature, and radicated in the heart, but only aſſociations of viſcous ſubſtances in the degenerated Bloud, formed in thoſe places where he found them.

[x] It is very doubtful whether Polypi ever formed at all previous to death.

But indeed it ſeems probable, that if any of theſe broken *polypi* get into the narrow paſſages of the arteries in the *Brain*, they may cauſe ſuch a ſtop of the Bloud there, that it not finding its uſual way open, may, by the impetuoſity of its motion, make it ſelf a new one into the ſubſtance of the *Brain*.

So that from any of theſe cauſes the Bloud in its circulation paſſing (as I have ſaid) *irregularly* through the *Brain*, may, if this part happen to be more than uſually ſuſceptible of an impreſſion from it, either *deflect* into the *lateral* yielding *receſſes* in its habit, or by reaſon of a partial obſtruction of the veſſels, *diſtend* them; ſince being impelled in the uſual quantity, but deficiently tranſmitted, there muſt quickly follow ſuch a congeſtion, that either a *ſtagnation* of it in the veſ-

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ſels muſt happen; or an *exudation* of ſome parts of it through the widened paſſages; or elſe, if the impulſe prove to be more violent, a *laceration* of them; from whence comes an *Extravaſation*, which will be continually increaſed from the continual impulſe upon parts thus become unfit to reſiſt the motion.

But of theſe cauſes of *Apoplexies*, eſpecially thoſe which prove moſt fatal, the *Effuſion* of Bloud, mentioned, ſeems to be the moſt uſual (though as I ſee not but the diſtemper may, as I ſaid, proceed from only a *Congeſtion*, ſo poſſibly this may be that from which moſt recover that doe at all, however by continuance it may prove as dangerous, as being the beginning of that by effuſion, and a ſtop of the Bloud even in the veſſels for any conſide-

rable time neceſſarily kils) both from what appears upon diſſection; not only *Wepfers*, before mentioned, bnt others, obſervations evincing it, and I my ſelf happened to obſerve the ſame in the diſſection of a very worthy Lady, the Lady *Pakington*, the relation whereof was publiſhed in the Philoſophical Tranſactions, *Num.* 173. *A. D.* 1675. as alſo in regard it ſeems difficult to make out how, from a *ſlow congeſtion*, if *viſcous matter* be the cauſe, or from an *exudation* of *Serum*, the diffuſion whereof, though ſomewhat more ſpeedy than in the ſuppoſition of viſcoſity, is yet comparatively ſlow to the ſodainneſs of the invaſion, much more from *ſo very ſlow a congeſtion* as muſt produce a fleſhy ſubſtance as the *polypus* is (unleſs on the occaſion of its diſlodging, even now mentioned) all the Animal

Animal functions from a perfect exercise of them, as is most usually observable, should so instantaneously be destroyed. Whereas the *effusion of the Bloud* out of its vessels may rationally yield an account of this defection with as great swiftness as can be imagined; the Bloud as I said before, once got out of its channels being propelled, by means of the impulse from the heart, so as to diffuse it self immediately over the whole substance of the *Brain*, so farr as the investing membrane will permit. And though only *one Lobe* of it chance to be disaffected, yet the commerce being broken off betwixt the spirits in this and the rest (it seeming probable, though, from the disproportion of our organs to discern those extremely small passages, not autoptically demonstrable, that there is a constant one by

ſome ſmall *Meatus* through the whole *Brain*) the action of the whole muſt ceaſe; ſince 'tis obſervable that, for preforming regularly the actions which are the province of any organ, *all the parts* of that organ muſt be duly conſtituted; and therefore much more ought this to be obſerved in the *Brain*, whoſe action is ſo much more conſiderable and nice than any of the reſt, as influencing the whole Body, as well as its texture is more curious, and ſubſtance more tender.

The *Fourth* thing propoſed to be conſidered was, the *Diſpoſition of the part*, where the diſtemper is ſeated, to be affected; which having endeavoured to make out to be the *Brain*, we are to reflect that much of the invaſion of the diſtemper (as was before inſinuated) is owing to the *vitiated organization* of it, and

and *not all* to the *perluent liquors*. For if it be firme in its tone, and otherwiſe rightly conſtituted, there is reaſon to ſuppoſe it may, *cæteris paribus*, much reſiſt morbifick impreſſions; whereas if it have been before weakned, 'tis obvious 'twill eaſily yield to them. We ſee in *Feavers* that the Bloud runnes rapidly enough through it; and in an *Anaſarca*, and cachectical habits, the *Serum* makes up much the greateſt part of the Bloud, which might therefore be preſumed apt to overflow that tender part; ſo alſo 'tis obſervable, that the Bloud many times appears extremely *viſcous*, as in *Pleuriſies*, *Rheumatiſmes*, *&c.* Yet in none of theſe caſes ordinarily are the perſons inclined to *Apoplexies*: ſo that though the irregularities of the liquors may ſometimes occaſion them without this

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prediſpoſition oft he *Brain*, yet when it appears they invade *more frequently* than otherwiſe they uſe to doe, there ſeems conſiderable reaſon, to ſuppoſe, that it *deflects* ſome way or other in its *Organization* from what is natural to it. This defect, I deny not may perhaps *ſometimes* conſiſt in too great a *Cloſeneſs of its texture*, whereby a partial obſtruction of its veſſels may be made by degrees, from the adheſion of ſome viſcouſe matter depoſited by little and little by the circulating Bloud about the capillary arteries, and ſo the Bloud behind comes indeed only to be retarded here whilſt no diſturbance happens to it, but takes its courſe to ſome other region of the Body; but if it once come to be more than ordinarily exagitated, it may become ſo determined in its motion, as at laſt

laſt to flow impetuouſly hither too, but not being able to get through its uſual channels muſt produce the effects, before ſuggeſted, of an irruption into the ſubſtance of the *Brain*: but yet *ordinarily*, I conceive, it depends upon *too great Laxity of it*; whereby, when any forcible impulſe happens, it may too readily yield to it, and ſo be ſodainly overwhelmed. This laxity may be conſidered to conſiſt, not only in a greater *intenération of its ſubſtance* than uſual, and thence its eaſineſs to yield to the force of the impelled Bloud, to which in its due conſtitution it bears a proportion; but likewiſe in the greater *openneſs of its pores* than is natural, though the fibres that conſtitute it have their due degree of firmneſs, whereby it becomes capable of receiving other, and more bulky particles than uſual,

uſual, as is conſequential upon that texture ſo depraved: which may poſſibly (as in too ſerous and acrimonious a dyſcraſy of the Bloud) proceed from the abraſion of ſome of the looſer particles that conſtitute the habit of the part, by the perluent juyce ſupplyed by ſuch Bloud, and I ſuppoſe might be the caſe of the *Lady* before mentioned, who being endued with an extraordinary *acumen*, a great evidence of an exquiſite conſtitution of the *Brain*, yet abounded with exceedingly ſharp ſubſtances in her Bloud or other liquors, as many, of her ſymptoms declared. Which pores likewiſe may acquire other *figures* than are proper for them; theſe concurring particularly to determine almoſt any of the *Secretions*, whether ſimple or mixed, that happen in our Bodies. So that when the *Brain* hap-

happens to have its *Organization* thus vitiated, and the *other cauſes* concurr, an *Apoplexy* may in probability eaſily enough be produced.

So that, to recapitulate, I conceive the *part effected* may either be the *whole Brain*, or any *conſiderable part* of it, and either the *Cortical*, or *Medullar*, but eſpecially (or at leaſt firſt) the *Cortical*, from whence the diſaffected matter is tranſmitted to the parts of it which lye deeper, where the animal ſpirits principally exert themſelves; the *Nature of the diſtemper* to conſiſt, in the *ſodaine abolition* of the due *excraſie*, and *diſtribution* of them thence; the *immediate cauſe*, moſt uſually (when unavoidably fatal) an *effuſion of Bloud* out of its veſſels upon the *ſubſtance of the Brain*, though I conceive a bare *diſtention of the arteries* there may occaſion

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it, as also may perhaps a *congestion* of *viscous* or *serous matter* when it comes to a considerable degree, and becomes freshly *excited*; or else *Polypous concretions*, or (if we can suppose it) *any other* obstructing matter deposited in it, may at last produce it; and the *predisposition* of the *Brain* to it, to consist, *usually*, in the more than *ordinary laxity*, or *openness* of it.

These things premised I consider (to advance a little farther toward the solution of the Probleme) that whatsoever, either 1*st*. causes a congestion of Bloud, or 2*dly* otherwise so indispose it, that it cannot readily and duly circulate through its usual vessels in the *Brain*, or else 3*dly* disaffects the *Brain*, whether by weakening its tone, or altering the figures of its passages, or straitning them too much, may occasion

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Apoplexies: and the greater urgency or violence, of ſuch antecedent cauſes may introduce a greater frequency of them than ordinary.

As to the *firſt*; Beſides common obſervation, 'tis obvious to any mans reaſon, that thoſe who indulge themſelves in full meales, but eſpecially in copious drinking, and uſe not due exerciſe, may fall into them, eſpecially if their natural conſtitution incline them to breed Bloud plentifully; ſince ſo it muſt be heaped up in too great a proportion for the veſſels, and thence may eaſily be ſuppoſed to make its way out of them, upon, even light occaſions into the moſt yielding parts. Beſides, perſons given to theſe exceſſes doe frequently, either voluntarily, or by the neceſſity of the irrigation made on the *Brain*, allow themſelves likewiſe great liber-

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ty of ſleeping, and ſo relax the *Brain*; whereupon the Bloud flowing more plentifully in the uſual poſture of it, *viz.* lying along, may be preſumed without great difficulty to get out of its veſſels, diſtended on this occaſion, into it. And it ſeems rather to be wondred at that no more fall into them, than that ſome doe from this cauſe; ſince there are ſo obvious reaſons of their production from the number of thoſe who thus indulge themſelves. But this ſeems no adequate reaſon of their greater frequency now than formerly, ſince theſe exceſſes have been of a much longer date, than to give occaſion hence to juſtify the temperance of former ages comparatively to ours. Therefore,

Secondly; as to the cauſes of thoſe dyſerafies of the Bloud, from whence the immediate continent cauſe of

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Apoplexies flowes, we muſt ſeek them from without us, ſince our Bloud has its ſupplyes ſo: and its motions, whether circular or inteſtine, are excited or retarded by abundance of outward, and the moſt of them inevitable (our ſhallow knowledg and foreſight in chooſing what is proper for us, and avoiding what is prejudicial, and the unmanagable bent of our inclinations to what gratifies us, eſpecially conſidered) occaſions. From which external cauſes likewiſe.

Thirdly, the diſpoſition of the *Brain* to fall into theſe diſtempers muſt proceed; theſe being as well diſpoſed to act on the ſolid, as fluid, ſubſtances of our Bodies, as they find them fit to receive their impreſſions.

The external occaſions therefore of our diſorders are generally deduced

duced from ſome or other of the ſix Non-naturals, ſo called, *viz.* Air, Meates and Drinks, Motion and Reſt, Sleep and Waking, ſubſtances excreted or retained; and the paſſions of the mind: any of which, if inordinate, may produce ſuch diſeaſes as the Body, upon ſome peculiar prediſpoſition, is ſubject to.

'Tis beſides my ſubject to dilate on them particularly, eſpecially as they contribute to produce the groſs of diſeaſes; neither doe I think the five latter ſo very applicable to my preſent theme, as to detain me. But the firſt ſeeming the moſt uſual and efficacious, as to the production of all, or the greateſt part of other diſtempers, ſince 'tis ſo generally influential and unavoidable, ſo of this, I am obliged to take ſome notice of it. For we may in a great meaſure

ſure correct irregularities in the reſt; but not ſo in this, without which we cannot live many moments; neither is it in our power to correct its diſorders, if any thing conſiderable, ſince it diffuſes it ſelf every where; and muſt therefore, if vitiated, be the cauſe of general diſtempers, and more eſpecially ſeems to have a very prevailing energy to introduce that under conſideration.

Its diſorders are generally reduced to two heads, *viz.* either exceſſes in (one at leaſt of) the Firſt qualities, Heat, Cold, Moyſture, or Dryneſs; or elſe Malignity in it, unaccountable for from them (whatever it ſatisfactorily be from any other vulgar notions) which may be of very different kinds, and ſo produce diſtempers, different as to their ſymptoms, yet of that ge-

neral denomination. Theſe have been ſo copiouſly and learnedly treated of by many great Authors, that 'twere very impertinent in it ſelf, as well as unfit for the brevity of a letter, to expatiate on them: but particularly the Doctrine of Malignity ſeems too abſtruſe to be diſcourſed of in few words; only (if it be not a ſoleciſm to pretend to judge of things of which we can aſſigne ſo little reaſon) it ſeems beſt adjuſted to give an account of diſeaſes that generally invade, and where indeed ſurpriſing ſymptoms, whoſe reaſons cannot be aſſigned from known hypotheſes, happen, as in ſome Epidemical feavers, the Plague &c. For it ſeems agreeable to reaſon, that it muſt be ſomewhat more than what is deducible from the firſt qualities, as well as very active, that muſt ſo affect multitudes of people

people of different conſtitutions, and of whom many have no evident predispoſition to ſickneſs, with ſo extraordinary indiſpoſitions, and that at times when the Air is free from exceſſes in any of the firſt qualities, (or indeed any of the reſt of the ſenſible ones:) and 'tis acknowledged by all, how differently ſoever they explicate the matter, that theſe epidemical miaſmes are ſo.

But to give an account of the production of the preſent diſtemper, we have no need to have recourſe to this abſtruſer cauſe. For, firſt, this can hardly be reckoned among Epidemical diſtempers, however more frequent than formerly; ſince at all but few, comparatively to thoſe who are with other diſtempers, are aſſaulted with this, and thoſe not in one region, but here and there in farr diſtant places, at all times of the

Year, and at all ſeaſons, whether of exceſſive Heat, Cold, Moyſture, or Dryneſs; (though, as I ſhall by and by obſerve, it took its riſe from one of them.) Secondly, 'twas never obſerved, nor thought, contagious, as moſt Epidemical diſeaſes that depend upon Malignity, are; thoſe ſubtil ſteams that occaſion them being, as very diffuſive, ſo alſo determinately fermentative to the production of like ſubſtances in the Bodies they enter into; which when emitted, and then received by others which have a prediſpoſition (as moſt have; a ſmall one being ſufficient in ſo heterogeneous Bodies as ours are, and where the ſubſtances that compoſe them are ſo lax, and in ſuch an agitation) to be by them acted on, muſt affect them in the ſame manner. Thirdly, there ſeems nothing in the ſymptoms but what is conſtantly

conſtantly obſervable in almoſt all aſſaulted with it, and agreeable to the general hiſtory of it; whereas thoſe called epidemical have generally ſomthing anomalous in the ſymptoms, when ever they ſo invade, from what has been obſerved in thoſe of the ſame denomination at other times. And fourthly it ſeems accountable enough for, from the conſideration of thoſe more obvious qualities of the Air. So that I conceive 'tis rather to be reckoned among the Sporadical diſeaſes, ſo called by Phyſitians; and to proceed from ſome, or one of theſe (modifications of the Air, which we call) firſt qualities. But from which of them, 'tis requiſite we enquire.

To conſider firſt the Paſſive qualities of the Air, Dryneſs and Moyſture; it may perhaps ſeem proba-

ble that they may, in order to produce this, as well as ſome other diſtempers, indiſpoſe the *Brain*; the former by hardning the tone of the ſanguiferous veſſels in general, and conſequently contracting their tubes, and ſo cauſing an acceleration of the motion of the Bloud through them (which muſt, if propelled with the ſame force at its original, runne more ſwiftly through veſſels when thus ſtraitned, than whilſt having their uſual dilatation:) whereby it may be preſumed, that when caſt forth of the arteries into the interſtices between them and the veins at their extremities, it may make its way into the more yielding ſubſtances it is any where to paſs through: and the *Brain* being confeſſedly more ſo, than any other part of the Body, is therefore moſt likely to be affected on ſuch occaſion;

ſion: the latter (which is countenanced by the great Hippocrates, Sect. 3. Aph. 16.) by intenerating the *Brain* ſo much beyond its uſual conſtitution, that it may thence become more than naturally ſuſceptible of the always briskly circulating Bloud. Next; as to the moſt efficacious of the Active ones, Heat; it may perhaps be urged that the Bloud, though otherwiſe well enough conſtituted, being much heated and rarifyed by that exceſs of the Ambient, might be inclined to make its way out of the veſſels, in the *Brain* eſpecially, on the account of its forementioned tenderneſs.

But, beſides that experience warrants none of theſe ſuppoſitions, perhaps it can hardly be made out, 1*ſt*, That ſo great a dryneſs, as muſt effect this, can be introduced into our Bodies, which are continually irri-

irrigated, not only by the circulating Bloud, but other ſecondary liquors; 2*dly*, That a great exceſs of moiſture in the Air ſhould produce *Apoplexies*, unleſs thoſe more rare ones (as I ſuppoſe they are) from the *Serum*, and that generally after other diſtempers which have weakned the craſis of the Bloud, as well as the tone of the *Brain*; ſince ſuch a dyſcraſy impreſſed on the Bloud ſeems to make it more torpid by clogging the ſpirits in it, and ſo leſs apt to inundations, and beſides relaxes the veſſels, as well as the ſubſtance, of the *Brain*, and ſo favors its ready paſſage along them; and, 3*dly*, That the exceſs of outward heat ſhould cauſe this eruption; ſince by it the ſolid parts may be as well preſumed to be invigorated to reſiſt, as the Bloud excited to attempt it; beſides that the tranſpiration,

tion, that is occaſioned by this heat, may ſufficiently compenſate for the accelerated motion of the Bloud, its quantity (which may in that caſe be principally dangerous) being thence diminiſhed.

It remains then to attribute this frequency of *Apoplexies* to the Coldneſs of the Air, as the moſt adequate occaſion; which when it happens to be intenſly ſo, may, I conceive, be made out to give a probable reaſon of it.

That Cold is a great enemy to the *Brain*, is both the general ſenſe, and confirmed by the authority of Hippocrates, Sect. 5. Aph. 18. and all *Phyſitians* ſince: and therefore we may poſſibly inferr that the great *Architect* fenced this part with ſo ſtrong a wall, ſcarce more to protect it from other injuries than this, to which 'twould otherwiſe be expo-

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ſed. But how Cold affects it ſo injuriouſly may require a little explication.

In order to it, give me leave, Sr, to conſider (without pretending to diſcuſs it ſo minutely, as men of more *Philoſophical* heads, and better accompliſhed in ſuch ſpeculations, might) the nature of Cold, as being requiſite to be known in ſome meaſure to the underſtanding its relative effects. Which attempt indeed might appear very preſumptuous, after that the exquiſite Mr. *Boyle* has not thought fit to determine in the matter, but that you may perhaps find that the ſhort deductions I make, however unartificially, are either taken from, or, I conceive, reducible to what he has delivered; and ſo farr from being poſitively aſſerted, that they are only ſubmitted to the cenſure of your, and

and others, better judgments. To which purpose three or four general considerations seem not unfit, so farr as belongs to our present disquisition, to be taken notice of, to give an account of its manner of affecting us.

In the first place then it may be considered, that though neither Cold nor Heat nor any of the rest of the sensible qualities have any real Being, but only in relation to our perception; insomuch that were there no sensitive Beings there could be no such things; yet they must be founded on somthing that does really exist, as all accidents besides are. So that though they cannot be reckoned amongst the general affections of matter, as motion (though they depend upon it) or its contrary, *Rest*, *Bulk*, *Figure*, *&c.* are, which would still be where matter is, tho' there

there were no ſenſitive Beings, yet are conſequent upon it, but determined by theſe and aſſociated to ſomwhat that has perception.

Secondly, That 'tis evident our ſenſories are affected by Cold, that is, have ſome impreſſion made on them. Now nothing can affect but by approaching to that which it does ſo affect, and to approach requiring motion it muſt follow that motion muſt go to conſtitute the nature of Cold. Which though it may ſeem not ſo evident, ſince Cold is reckoned contrary to Heat; and this conſiſting obviouſly in motion it may be urged, that ſhould in Reſt: Yet it may be returned, that tho' it be neceſſarily to be inferred, there is motion where there is Heat, yet not always that there is Heat where motion: ſo that 'tis not motion ſimply, but conſidered with ſome adjunct,

junct, *viz.* motion in such or such a degree, and with relation to sensitive Beings that constitutes Heat; and consequently that 'tis not to be inferred that Cold consists in absolute Rest, because contrary to Heat, but in a different degree of motion (though other mechanical affections must concurr to determine it) which recedes on one hand from a middle degree of it in our sensory, as that which makes Heat does on the other. Which too may be evinced from hence, that each of them having a great latitude of degrees must be founded in what admits of degrees, which motion does, but Rest not.

Thirdly, that motion here being not to be considered abstractedly, but together with the subjects of it, and as occasioned by, and produced in some Bodies; we may take notice,

notice, that as 'tis evident the Bodies without us, which excite our ſenſation, are moved, ſo our organs, which are deſigned to receive the impreſſions of theſe extraneous objects, and tranſmit them to the Soul, can hardly be preſumed to do it (any more indeed than prove a fit *manſion* for *her*) without having their particles (whether conſiſtent or fluid; for both are neceſſary to their conſtruction) in motion: and not only ſo, but endued with a determinate degree of it. This degree ought not to be violent: for ſo the conſtituting particles neither could be brought into ſuch a frame as we find they are, nor perſiſt in it; but they (eſpecially the moſt ſubtil, which are the Souls immediate inſtruments in the organ) would ſoon undergo new textures, or be diſſipated. As on the other hand it muſt not be very lan-

languid, ſince in that caſe they being in great numbers, and ſome touching ſtill in their motion upon others which have a different determination, would ſoon be intangled in one another, or otherwiſe ſtopped. But it muſt be ſuch a middle one, as may keep up a due craſis in both the fluid and conſiſtent ſubſtances that make up the organ, for the performing the functions appointed.

Fourthly, that theſe motions (conſidered as I ſaid in their ſubject) thus regulated, being congenial to us, ſeem not properly objects of our perception (at leaſt are not taken notice of) ſince 'tis by means of them that the Soul receives thoſe impreſſions that cauſe a perception of others, but rather inſtruments of tranſmiſſion of thoſe others from without, which recede from theſe degrees,

degrees, or are otherwiſe circumſtantiated: tho' indeed even theſe, when, becoming either too quick or too ſlow, they deflect from their due proportion, may, by affecting the Soul differently from what they uſe to do, ſo excite her, as that ſhe may take notice of them too, as well as thoſe of exterior objects which thus ſollicite them.

Fifthly, that therefore theſe mean motions, being what belong to the organs duly conſtituted, are the ſtandard from whence wee are to take our meaſures of all others, ſo that when any objects from without come againſt, and ſo affect, our ſenſories with a greater degree of motion, than what naturally belongs to them, we forme one kind of notion of them; when with a leſſer degree, a very different one, and give them likewiſe denominations according

according to that degree of motion with which they act upon our ſenſory.

From the conſideration of theſe particulars, we may, I conceive, deduce, that the nature of Cold conſiſts in a check (though not a total ſtop) of that degree of motion, which belongs naturally to the parts of, and fluid ſubſtances in, thoſe of our ſenſories which concern the ſenſe of Touching, duly conſtituted; as, on the contrary, Heat (without ſome reflection on which, Cold can hardly be underſtood) in an acceleration of ſuch their motions. Which differences being, by means of theſe organs tranſmitted to the Soul, and ſo affecting her, ſhe, forming a compariſon between them, denominates one Heat, and the other Cold.

But though motion muſt have the firſt conſideration in producing

this effect upon us, yet 'tis farther to be noted, that the Bulk, and Figures, both of the Bodies that cauſe this check, and thoſe upon which 'tis impreſſed, muſt concurr to it: it being evident, that not only ſome are themſelves more fit and eaſy to be moved than others, according as they are bigger or leſs, of this or that figure, but alſo to accelerate, or retard, the motions of others that impinge againſt them.

As to acceleration, wherein Heat conſiſts, minute Bodies, of almoſt any figures that are irregular, if they are not apt to cohere, may occaſion that though ſome more than others; eſpecially thoſe that are moſt angular: ſince with their angles ſtriking againſt thoſe among which they move, they muſt be preſumed to exert a proportionally greater force, than blunt or glabrous ones can, which

which on that ſcore are eaſy to be diſtorted. But as to retardation which makes the nature of Cold (that we may reſtrain our diſcourſe to that) it may be occaſioned on ſeveral accounts. For, firſt, either the affecting Bodies may, by a correſpondency of their ſides, ſo apply themſelves to thoſe to which they come, that, transferring their ſurpluſage of motion to them, they may adhere to them, and with them conſtitute bigger maſſes, and acquire other figures than before they had: Or, *Secondly*, by altering the due contexture of the veſſels (which is neceſſary to regular motions) they may thence occaſion a ſtop of the ſubſtances, which uſed to be carryed in them; and ſo, though they are otherwiſe diſpoſed to accelerate motion on the account of their figures, as I ſaid before, yet thus ac-

cidentally they come to retard it: Or, *Thirdly*, if they happen to be of ſuch a figure and texture as to be flexible, and thereby to wrap themſelves about thoſe they occurr to, they may, by thus inviſcating them, hinder their motion: Or, *Fourthly*, (and which may poſſibly, in the preſent caſe, be the moſt effectual means of occaſioning this check) they may ſo interpoſe themſelves between the moved particles in the organ, as to intercept their former motions; whereby alſo they fill the ſpaces neceſſary for continuing thoſe motions. This ſeems moſt agreeably to be done by Conical ones, which by their angle are fitted to enter, but being blunt and bigger at the other extremity, muſt, when they come into poroſities, which are a little ſtraiter than that neceſſarily fix there; and both the

the more abate the motion of the forementioned agitated matter, and alſo be more firmly impacted in the parts unto which they thus arrive, by their contraction, upon the ſcore of the lancination occaſioned by the ſharp angle of theſe particles firſt entring: the ſolid parts, that are ſenſile, being all the Body over contractile, as being, I ſuppoſe, nothing elſe, but either propagations of *nerves* or the *roots* of them. And when it happens that many ſuch conical ſubſtances come to act at once upon the organs, the effect muſt be the more conſiderable.

But perhaps, Sr, you may think theſe ſpeculations too nice and general; and indeed impertinent to the preſent conſideration, ſince they are not our ſenſes that are in *Apoplexies* primarily affected; thoſe perſons that are violently ſeyzed

looſing, immediately upon the ſtroke, the uſe of them; but only influentially from the *Brain*, which it ſelf is thought to be void of ſenſe actually (which ſuppoſition yet may perhaps be lyable to ſome exceptions) though the ſource of it to all the Body beſide: And therefore when they invade more gradually, and thoſe that are affected are conſcious of great pain in the head, it may be ſuppoſed that the morbifick matter affects the membranes of the *Brain*, as well as the ſubſtance, and ſo cauſes that ſymptom. So that if the prediſpoſition to the diſeaſe be from Cold affecting a part of our Body not ſenſible, you may ask to what purpoſe all this notion of our perception is introduced? However give me leave to ſay, that ſince Cold would not properly be Cold, as I have urged,

without

without perception; which though it produce all the effects, it does on Bodies not endued with ſence, on a purely mechanical account, *viz.* from ſchematiſmes of matter in motion, determined by the fitneſs of ſome to act on others, according as they appel to one another; yet as it relates to us, who are endued with ſenſe, and to whom it belongs to define things cannot be well underſtood without reflection on that; it ſeems not altogether alien to our purpoſe to ſtate it in that latitude, ſince without ſuch a reflection we cannot have a notion of it; and therefore not explicate its poſitive nature, and what produces it. And indeed whether theſe ſpeculations are altogether ſuperfluous, may be judged from taking, firſt, ſome ſhort view of the nature of the Air, ſo farr as concerns its aptitude to act

on

on Bodies converſant in it, particularly ours, it being the Medium to conveigh the influence of exteriour (when not immediately contiguous) objects, or at leaſt neceſſarily concurring to make conſiderable impreſſions on us who, 'tis knowne, cannot live many minutes without it, eſpecially in relation to it when deflecting toward Cold: and ſecondly, its manner of affecting injuriouſly our Bodies, particularly the *Brain*, upon the account of the foremention'd mechanical affections.

And firſt, as to the Nature of the Aire; Though, generally ſpeaking, we call ſo all that vaſt congeries of corpuſcles wherein we breath, which is made up of all ſorts of particles from the earth and water, and ſteames raiſed from complex bodies in or upon them, yet more properly (according to the Philoſophy of

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the Age, which acknowledges the Excellent Mr. *Boyle* its cheif refiner) 'tis ſuppoſed to conſiſt in the greateſt meaſure of ſpringing particles, *viz.* oblong, and conſiderably rigid ones, though very tough, and thence apt enough to be bent by a great preſſure, but yet unapt to looſe force of reſtitution toward a direct line (which ſeems moſt natural) when that preſſure is taken off; and which they, whilſt thus bent, are continually (from the action of the *materia ſubtilis* according to *Deſcartes*) endeavouring at: From which tendency to reſtitution there muſt be variety of motions impreſſed on all bodies converſant in it, according as they are diſpoſed to receive its action. But yet among theſe 'tis ſuppoſed there are a conſiderable number of others, called Nitrous, whoſe make may poſſibly be

that

that a little before deſcribed, *viz.* Chnicall or Pyramidall (for I ſuppoſe either may ſolve the Phænomena, which require only acuminated particles whoſe other extreme ſhould be bulky) and from the mechanicall effects may very much juſtify that moſt ingenious notion of *Deſcartes*, who ſuppoſes Niter to have Conicall figures. For on the account of theſe the particles of it may, like wedges, eaſily intrude themſelves into the *Interſtices* of any bodies they happen to be carryed againſt, and, if theſe be yielding enough, make themſelves more and more way amongſt them, and therefore may intercept the motion of ſome as well as very differingly determine that of others of the fluid ſubſtances contained in them; ſince none, of what texture ſoever, can be preſumed to elude the action of ſuch kind of bodies.

dies. Which ſuppoſition concerning their fabrick appears to me the more probable, becauſe fitted to explicate the matter mechanically, that is, intelligibly. For I conceive all the world of bodies, and their actions, is pure Mechaniſme; and therefore 'tis requiſite all explications relating to them, deſigned to informe, and not to puzzle, ſhould be founded on principles of that kind.

And indeed though it be impoſſible to make ſo full a diſcovery of the ſmall conſtituting particles of this as well as any other concretes, that we may have ground to dogmatize on them, they being much below the perception of our ſight, though aſſiſted even by the beſt Microſcopes; yet ſince few of them act to our perception, ſingly, but to doe it muſt be aſſociated into ſomewhat bulky

bulky concretions; which may poſſibly be allowed to make deductions from the obſervation of ſuch, when we find them to convene in a familiar and natural way. Conſequentially whereupon we may take no tice (for the confirmation of *Deſcartes*'s notion) of what the curious Mr. *Leewenhoeck* obſerved with his exquiſite Microſcope, as to the concretion of Niter, diſſolved in water, upon evaporation (to be met with, *Philoſoph. Tranſact. Numb.* 173. *Jul.* 26. 1685.) *As*, ſaith he, *The water in any place began to be evaporated I found many figures whoſe baſis was ſquare, and riſing to a Pyramid.* And though there were other figures exhibited, yet it may very eaſily happen that upon a coalition of a multitude of theſe extremely ſmall particles, in ſo confuſed a manner as muſt be upon an evaporation (beſides

ſides that many of other kinds may aſſociate with them) variety of figures may well emerge from thoſe ſo convening, though the principal have the forementioned tendency. And beſides, though the figures of minute ones might not be Pyramidal, yet it may be ſuch as to fit them, from their congruity to one another, to aſſociate ſtrictly into this; it being by many Chymical inſtances of the acting of bodies, ſalts particularly, on one another, obvious that theſe of very different makes doe, upon their colliſions, when diluted in a fluid, unite into concretes very ſtrict that have little or no cognation in their figures to either of thoſe ſingly that went primarily to conſtitute them: So that when freed from their diluting moiſture, which brought them together, and then preſſed upon by the ſtrokes of the Ela-

Elaſtical particles of the Air, they may poſſibly come to cohere ſo ſtrictly (ſuppoſing their ſides ſmooth and flat, as it ſeems probable they are even from the obvious figure of the concrete; and is deducible from that effect of the Air in the much noted inſtance of two flat marbles) and be ſo hardned, as to be fit to act (their acuminated figure conſidered) almoſt equally vigorouſly, as if they had been primitive ones, on Bodies not of the very cloſeſt texture. Nay ſince they are deſigned to act on ſuch which have no very compact texture, for the moſt part; it ſeems congruous that theirs ſhould be ſuch likewiſe, to bear a proportion to them, which perfect ſolids of thoſe bnlkes and figures, that were primitives, would not.

'Tis true, *Deſcartes* aſſignes that figure to the particles of *Niter* to explicate

explicate the manner of its Accenſion, which produces Heat, when ſo modified; and that perhaps more violent than any other Bodies doe. But as 'tis ſufficiently known that in many inſtances it much refrigerates; and there muſt be a natural reaſon for one effect as well as the other; I conceive that of both, however oppoſite, may genuinely enough be deduced from that fabrick, according to different modifications; and therefore may be preſumed to eſtabliſh the notion of that kind of figures. For in order to produce the latter they, by entring with their *apex*, as I juſt now ſaid, into the poroſities of the organs (which they muſt do, if the point be very ſharp, though carryed to them with ever ſo ſlow a motion) and ſtill piercing more deeply by degrees, may placidly enough retard the motion of the

the ſubſtances therein agitated. And indeed to effect this a comparatively ſlow motion ſeems neceſſary; ſuch as agrees not only to the forementioned notion of Cold, but alſo both to the Air in general, which is placed in a boundleſs *expanſion*, and therefore being not ſtraitned muſt move calmly enough when not forcibly impelled; and eſpecially to theſe *Nitrous* particles, which being diſſociated by others of different kinds one from another, and having ordinarily there no violent impulſe, muſt, on the account of their make, move leiſurely when carryed with the whole courſe of the maſs of Air; and the rather, ſince the reſiſtance, which their concomitant ſubſtances make againſt the thicker extremity of them, muſt much retard their motion. Withal, if it happen that theſe pointed particles enter into the

the paſſages of thoſe ſenſible Bodies, they may be preſumed ſo to ſtrike againſt ſome of the fibres that conſtitute them, that they muſt from thence irritate them to contract themſelves, and ſo the motion of the fluid ſubſtances in them muſt be effectually checked. But as for the production of Heat, another modification of them muſt be aſſigned, *viz.* a very brisk agitation from ſome external occaſion; which happening, the *apex*, being more eaſily agitated than the baſis, muſt neceſſarily deſcribe a circle about it, which by reaſon of its greater bulk cannot be ſo eaſily moved out of its place, but only gyrate about its proper centre according to the direction of its cone; and by ſo doing the cone muſt needs ſtrike very violently againſt ſuch Bodies it meets in its way; whence a ſence of Heat to

ſenſible Bodies muſt neceſſarily proceed, in regard the force of this agitation muſt be ſuppoſed to be greater than that of the moved particles in the organ: which too muſt be raiſed to a much more conſiderable degree, when great numbers of theſe particles conſpire to the like motion; eſpecially if minute accenſible ſubſtances of other kinds are interſperſed among them, which, both from their own diſpoſition to be ſo agitated, and their diſterminating a little theſe nitrous ones, whereby they may have room to begin their gyration, may promote this accenſion; as in the too fatally known experiment of Gunpouder. I muſt indeed acknowledg that the angles at the baſis of theſe corpuſcles, if they be Pyramidal, according to Mr. *Leewenhoeck*'s obſervation, may hinder the gyration, *Deſcartes* ſuppo-

ſuppoſes, in ſome degree: but 'tis eaſy enough to conceive, that, as well here, as for the making his *globuli ætherei*, theſe angles, by the very brisk motion the *corpuſcles* are put into may preſently be ground off, and ſo they fitted for this gyration; and this much more eaſily than in that inſtance: becauſe thoſe primitive particles muſt be ſuppoſed to have been exquiſitely ſolid, whereas theſe two have been *coagmentated* of ſome formerly divided, and only now *cohering* from the forementioned correſpondency of their ſides.

So that the difference ſeems to conſiſt in this, that to produce Cold 'tis requiſite that theſe nitrous particles ſhould both move ſingly and placidly, and alſo inſinuate themſelves amongſt ſuch ſubſtances as may confine them, being once en-

ter'd, on every ſide, and ſo hinder the above mentioned gyration: Whereas to ingender Heat 'tis neceſſary that they ſhould be, both in greater numbers, be briskly agitated, and generally move in a ſufficiently yielding medium, and at only ſuch a diſtance from one another, as that in their gyration they may beat off one another with their points; from whence the motions of others among which they move muſt needs be conſiderably increaſed; and withal they either previouſly require, or, if the force of the agitation be the greater, make in almoſt ever ſo cloſe a roome a conſiderable ſpace for themſelves to move in.

But perhaps an objection may be raiſed againſt what I intimated a little before concerning the ordinary motion of the Nitrous, particles in the

the Aire, which I ſuppoſe to be carryed with their *Cones* forwards: For it may be urged, that, being very confuſedly moved, and amongſt fluid ſubſtances, ſometimes the Baſis, and ſomtimes the ſides, may in ſuch an agitation be as well carryed ſo as the *Apex*, and then the conſequences of their inſinuation, which I deduce, cannot have place; the aſſigned figure being that which fits them to produce the effect. To which I returne, firſt that though ſome may in their motions, when brisk, ſo appel to Bodies as is objected; yet there being greater numbers, than ordinary, in Froſty Seaſons floating in the Aire, 'tis probable that ſome, at leaſt, of them will be carried as I ſuppoſe. But ſecondly, it ſeemes to me probable, that being moved placidly enough (according to the ſuppoſition) their

natural tendency must be with their points forwards: For in that posture they both find less resistance amongst those against which they move, and are supported in their motion by other lateral ones crowding upon them; and also those which are moved behind them impell them the more easily forward when they impinge against a flat surface (as the *Basis* is supposed generally to have, or at least what approaches toward it) than against that of any other figure; and therefore determine them to carry their *Apex* as I said.

But whatever their make be, 'tis both generally supposed, and seems to me very probable, that without these the Air could hardly be vital. For some substances that are fit to be agitated, but unapt to cohere, seeme requisite to be intermixed amongst

mongſt the various parts of our Bloud, and other liquors, which may, by their vibrations, whether occaſioned from without, or from the motion of our ſpirits, keep them from too cloſe complications, which that many of them are much ſubject to is very obvious: and theſe I take to be thoſe uſually called *Nitrous*.

But though theſe in the Air, may have a very great, if not the principal, influence, on any Bodies they can enter into to produce many effects, but particularly, on ſenſile ones, Cold; yet both the Elaſtical particles and alſo the ſteams before mentioned, with which the *Atmoſphere* is conſiderably ſtored, muſt much concurr to any of them; theſe on the account of their great variety and irregularity, whereby they are apt to be determined to very

very differing motion, and thence to ſollicite the particles of the Bodies they act on to the like, for the *Nitrous* ones to enter; and thoſe by their expanſiveneſs enlarging the paſſages for them. So that when the Air from any occaſion happens to abound more than ordinarily with *Niter*, the aſſigned effect of it may be preſumed eaſily to be produced, and eſpecially on our Bodies, which being of a contexture tender and yielding enough, muſt be injuriouſly affected, if either the motions, or other diſpoſition of its particles prove to be diſproportionate to the parts of them, or ſubſtances contained in them.

Therefore to enquire, *Secondly*, how our Bodies, but particularly the *Brain*, come to be thus injuriouſly affected from hence, we may take notice that the Air (with the ſub-

ſubſtances it carries in it) exerts it influence partly on the liquors, and partly on the ſolid parts.

Firſt, for the liquors; we may conſider briefly how it comes to be admitted into, and being ſo, after what manner it acts upon, firſt the Bloud, and then the nervous juyce (to omit the reſt of them, as little conducing to the preſent ſpeculation) and this as well amicably as noxiouſly.

Firſt, As to the Bloud (which is moſt conſiderable as to quantity and ſupplys the matter to the nervous and the reſt of the juyces) we may take notice, that though the Air may even by contact affect it in the ſurface of our Bodies, as conſiderably preſſing on us, and ſo perhaps arreſt or variouſly determine its motion in ſome degree, yet it muſt principally do this by being admit-

ted

ted into it. This admiſſion ſeems obvious; ſince, 1*ſt*, living in it, we cannot take any, either meats or drinks, but ſome Air will be admixed, and ſo be conveighed into our Bloud with them. Beſides, 2*dly*, it ſeems not improbable (though it have undergone ſome conteſt) that ſome of the finer parts of it may be admitted, in inſpiration, farther than barely the cavities of the *bronchia*, ſince it muſt be owned there are veſſels from the little glandules diſperſed throughout them, which tranſmit from the Bloud there: and whether thoſe veſſels may not receive ſomthing (tho' not ſo much) into them upon inſpiration, as well as caſt forth by expiration, may deſerve to be conſidered, ſince the Air comes into the *Lungs* with ſome violence; and they, being placed in ſo warm a ſituation, may (beſides the

the diſtention upon inſpiration) be preſumed to be as well lax enough to admit a ſubtil ſubſtance as eject a groſs one: and it ſeems not altogether improbable that nature might deſign this reciprocation of motion for that end partly. But withal, 3*dly*, the pores every where in the skin ſeem well enough adjuſted to admit ſomwhat from the Air, as well as conveigh forth thoſe very groſs impurities, which many times, if not very uſually, paſs forth without any trouble. And if it be objected that the tranſpiration continually proceeding from within muſt hinder any admiſſion from without by the ſame veſſels (which notion heretofore ſeemed to me to have great weight, as well in relation to theſe, as moſt other veſſels, and liquors in the Body, though, upon farther thoughts, it requires ſome limi-

limitations, which belong not to this place to be laid down) it may be replyed, that this tranſpiration, though it ſhould be ſuppoſed continual, is not in the ſame tenour ſtill; ſo that when it proceeds minutely, there may be an admiſſion perhaps from without, between the particles of this groſs and ſlowly moved matters in veſſels patulous enough; when we conſider both the great preſſure of the *Almoſphere*, which may eaſily enough be preſumed on that ſcore to intrude ſome particles of the Air between them to fill up the ſpaces left by the exhaling vapours; and alſo the ceſſation in ſome degree of the extruſive motion, whether proceeding from the expanſiveneſs of the evaporating matter or the too much contraction of the parts; both which remitting, the reſiſtance is leſs, and the room more, for the ad-

admiſſion of thoſe. Being thus admitted, 'tis obvious to deduce, from what was intimated before, how it ordinarily operates on the Bloud, *viz.* that partly by the inſinuation of its elaſtical and other irregular particles among the parts of it, partly the interpoſition as well as lancination of the nitrous, the ramous, and other groſſer, being kept in a continual agitation, do both undergo due comminutions, and alſo are hindred from too cloſely adhering, and thence as well from ſtagnating in the wider veſſels, as obſtructing the capillaries and interſtices between the arteries and veins. But ſuch an agitation being neceſſary to it for the keeping up its vital craſis, it may eaſily be inferred, that if ſuch Air be admitted as ſhall overmuch check this agitation, the craſis of it muſt come to be much altered, and thoſe

parts

parts which were before diſſociated by the briskneſs of their motion muſt, being conſiderably ramous, lay hold on one another, and ſo either become grumous, or create a viſcoſity in it, which, once begun, is not ſoon, nor eaſily, corrected; theſe particles claſping one another too firmly to be quickly unlocked by the permeating ſpirits; whoſe activity likewiſe theſe viſcous ſubſtances are apt to elude by their lubricity, thence obliging them to ſlip by them; or elſe inviſcating them.

Secondly, As to the nervous juyce; it being made out of the Bloud, muſt therefore, in ſome degree, undergo impreſſions analogous to what are made upon this from ſubſtances admixed with it; whether we conſider it in its due, or depraved, ſtate: ſince it may be eaſily imagined that ſome

ſome of theadmitted ſubſtances of the Air, before mentioned, may be depoſited into the nerves at their original, together with the true matter of that juyce: and beſides if the Bloud in general be once become viſcous (from whatſoever cauſe) 'tis ſcarce poſſible, but that ſome part of ſuch a matter muſt in the act of ſecretion paſs into the nerves: ſo that the Air, in ſome conſtitutions of it, much diſpoſing to viſcoſity, its influence therefore muſt be interpreted to be partly on this juyce at ſuch times. But moreover, I ſee no reaſon but ſome particles of it may when more than ordinarily abounding with ſuch ſubſtances as are ſubtil and active, even through the pores be admitted into this liquor; our Bodies being every where permeable to ſubtil ſubſtances; ſince I conceive, they in a due pro-

proportion are neceſſary even to the due ſpiritualization of this juyce; and therefore, for its excitation towards that may require to be admitted, partly, a nearer way than that round-about one of the chyle.

But, *Secondly*, The Air's influence muſt be acknowledged to be very great on the ſolid parts likewiſe; as both immediately touching upon ſome of them, and alſo, by reaſon of their firmneſs, being longer retained by them, when once admitted into their poroſities (which, by the mediation of the Bloud, beſides the other ways mentioned, which are applicable to theſe as well as the liquors, 'tis eaſy to imagine its particles may) than in thoſe fluid ſubſtances. So that in the forementioned ſuggeſtion of its ſuperabounding with noxious ſubſtances, they muſt be much diſpoſed to be affected

affected by it. And indeed there ſeem to be none, even of the moſt conſiſtent parts of our Bodies, but are pervious enough to, and conſequently apt to be acted on by, ſuch penetrating ſubſtances.

But among them all none ſeem ſo liable to receive impreſſions from them as the *Brain*, on the account of its tender conſtitution. For, tho' Nature hath placed ſo ſtrong fences about it, that perhaps 'twill hardly be admitted that the Coldneſs of the *Ambient* can greatly prejudice through them; yet that it may, by the mediation of the Bloud paſſing through it, is, I ſuppoſe eaſy enough to be allowed from what has been ſaid. But beſides, there ſeem two or three other wayes, by which, in ſuch a conſtitution of the ſeaſon, it may be injured; *viz. Firſt*, By the Air's affecting the *mammillary* pro-

ceſſes, as it paſſes briskly by them upon inſpiration: which being conſiderably large nerves muſt (beſides the conſideration of the impetuoſity of the Air's motion in that circumſtance) be acted on by conſiderable numbers of its particles at once, and ſo undergo a ſtrong impreſſion, which may eaſily enough be conceived to be propagated to the *Brain*; partly, by diſturbing their regular tonick motion, which muſt, from their tenſity, be continued up to their original; partly, by the ingreſs of too many of the lancinating particles of it into them; which beſides the fixing, or diſſipating, the animal ſpirits (which I conceive to be much of the nature of volatill ſalts) may diſorder the tone of theſe nerves firſt, and then (by the continuance of the impulſe of thoſe behind, which have the ſame ground

to

to attempt an entrance) that of the *Brain* it ſelf; which, being more tender than the nerves, muſt therefore, when the cauſe of the diſaffection reaches it, be proportionally injured. A ſecond way I conceive is at the ears, whoſe outer cavity going deep ſeems to be, in part, contrived for warming the Air, that it may not by its Coldneſs diſaffect thoſe exquiſitely ſenſible auditory nerves and the membranes, upon whoſe due tone and tenſity as the ſence of hearing ſeems mainly to depend, ſo muſt it be much impaired if ſo unuſual impreſſions are made upon it by intenſly Cold Air, and beſides thoſe nerves being thence ſo diſaffected muſt by their contractions conveigh the like motions up to the *Brain*, and ſo diſturbe and weaken it. And I formerly knew a very Learned perſon, who had a

total and irremediable deafneſs, that was cauſed, as he told me, by a journey taken in a very keene froſt over the Mountains in Wales: to which I remember not whether any *Apoplectick* diſtemper ſucceeded, but the inſtance at leaſt evidences the great effect of intenſe Cold upon the nerves, which had it laſted long, 'tis to me probable that by being propagated up to the *Brain* it might have produced either that or other nerval diſtempers. Another way, whereby I conceive the Cold Air may be injurious to the *Brain*, is at the extremities of the nerves in all parts of the skin, which having (as muſt be owned I preſume) apertures there, may poſſibly admit ſome ſuch ſubtil and lancinating ſubſtances, as I have ſuppoſed to be conſtantly, but in froſty ſeaſons more copiouſly, carried in the Air; and being

being once admitted may, on the ſame ground as I have urged in relation to the olfactory Nerves by conſecution come to affect the *Brain* it ſelf: But though their tracts are very long and ſmall, and ſo there cannot be a proportionable influence, as in thoſe; yet their great numbers, and the conſideration that they are on every ſide preſſed upon by the Air, may perhaps be thought to Compenſate for that defect.

But this preſſure of the Air on the ſurface of our Bodies (which I diſtinguiſh from that on the olfactory nerves on this conſideration, that in one caſe 'tis uniform, depending only on the weight of the Atmoſphere, or ſuch general motions in it, as make it act uniformly on all parts of the ſurface of them, which by their make, and private motions, determine it not otherwiſe; in the

other, ſome part of it is moved with a greater violence, from the dilatation of the parts deſigned for Reſpiration; whoſe cavity therefore being to be filled in proportion to that dilatation, it muſt happen that that portion of Air that does it muſt have briſker agitation than the reſt of its maſſe, and make impreſſions accordingly) this preſſure, I ſay, may prove chiefly injurious to the *Brain* by its acting on the *Nerves in the Eares*: Becauſe they, being terminated at a cavity which is ſtill kept warmer than the reſt, by the ſteames continually exuding from every ſide of it and for ſome time ſomwhat detained, there muſt therefore be more open, and conſequently more liable to injuries if an extraordinary occaſion happen, ſuch as I am inſtancing in, to make an impreſſion on them. And this muſt happen rather to tender

der Bodies, and thoſe who accuſtom themſelves to keep much within doores, than to the more robuſt, whoſe employments expoſe them much to the Air at all ſeaſons, both on the ſcore of the comparative flaccidity of all parts in them, and the defect of a due digeſtion in their bloud and other liquors through want of due exerciſe, which muſt diſpoſe them to be put into confuſion when violent cauſes come to excite it; and experience ſhewes that ſuch perſons of all others are moſt obnoxious to the alterations of the Air.

So that the manner of this action ſeems to conſiſt in the penetration made by the Nitrous particles (principally) of the Aire upon the *Fibres* of the *Brain* (for that as well as all other ſolid parts muſt conſiſt of *Fibres*) which thereby undergo ſome, how-

however ſmall, ſolution of continuity; and either the little cavities of thoſe *Fibres* (for I think the *Æconomy* of our Bodies can hardly be mechanically made out without ſuppoſing them all to be Veſſels, though our ſenſories cannot determine it) become ſtraitned, or their ſides perforated; on the account of either of which, they cannot duly either receive, or retain, and conſequently not regularly tranſmit, the ſubſtances deſtined to each part which is to be reſpectively ſupplyed by them. In that continuity, due confirmation, & repletion of them, I ſuppoſe the Tone of the parts to conſiſt: and therefore when any thing perverts any of theſe requiſites to it, as in our preſent caſe, all the conſequences, emergent from the impulſe of the bloud or other liquors diſturbed in their motion, may be expected.

Now

Now such an *Atony* happening to be in so very tender a part as the *Brain*, cannot therefore easily be rectifyed, but may continue much longer, than if it happen to other parts whose *Fibres* being stronger, and functions fewer, must on both scores (*cæteris paribus*) sooner and more easily return to their natural constitution. And not only the reason of the thing, but dayly experience, shews it; that whereas most other parts of our Bodies, having once received any injurious impression, as by falls blows, &c. do, after fit remedies used, return to their due tone quickly, the cause once removed; the *Brain* on the contrary long retaines its weakness if once injured, though for the present releived in some degree: as, for instance those that have had an *Apoplectick* fit once, doe many times, on whatsoeve

ſoever light occaſion either find a return of it, or at leaſt undergoe a conſiderable weakneſs of their intellectual faculties, not to be corrected but by a long and conſtant regularity, if it be at all: and the like is obſervable concerning thoſe who have been ſeized by *Vertiginous* and *Hypochondriacal* diſtempers (which I take to be properly Nerval, and to ſpring from the *Brain*, or its liquor, diſaffected) from which few happen to be perfectly freed: their imagination indeed, being diſturbed, diſpoſing them to be too immorigerous.

So that I conceive it may be inferred, that if the Ambient Air come to have a great degree of Coldneſs, eſpecially if it continue long, both the forementioned diſpoſition of the Bloud to ſupply matter for *Apoplexies* muſt be introduced, and alſo ſuch a debility may be impreſſed on the

the tone of the *Brain*, that they may much more readily invade, if the ordinary (though at other times innoxious, for the moſt part at leaſt) occaſions happen to bring theſe diſpoſitions to effect.

Now 'tis known that the Winter of the year 1683, (from which I date my *Æra* of this frequency of *Apoplexies*) was ſo intenſly cold, and that cold of ſo long continuance, that no mans memory living could ſupply him with a parallel year; and there was no need to repair to the Northern Region to make experiments of freezing ſpirituous liquors in order to find out the extent of this effect of it: ſince which time it may be obſerved that this diſtemper has been ſo rife.

But ſince 'tis requiſite the Aſſertion ſhould be eſtabliſhed as much as poſible by due obſervations, it came

came into my thoughts to examine the *London* Bills of Mortality; which may be presumed to be a standard for all the Kingdom, as well as all other places where the same constitution of the Air has happened. And though it may be urged, that the accounts of diseases in them are taken by persons who are not Judges of those things; yet many diseases carrying, by their obvious symptoms, such evidences of their nature, that 'tis almost impossible to mistake them, and above all, *Apoplexies*, as before was suggested; if the matter of fact (whereof the Searchers are Judges) as to the number of those that dye sodainly (and 'tis great odds those, for much the greatest part, dye of *Apoplexies*) be cleare, as I suppose 'tis acknowledged by all, I see nothing but it may be brought to establish the *Hypothesis*.

theſis. Having therefore looked into the general Bills for near Twenty years paſt, I find the account of thoſe that dyed of *Apoplexies* and ſodain death (which are there, and, I conceive, may paſſably enough be reckoned under the ſame claſs) to ſtand thus.

An. Dom.	*Apop. & ſud.*	*An. Dom.*	*Apop. & ſud.*
1670	79.	1679	103.
1671	63.	1680	95.
1672	65.	1681	94.
1673	84.	1682	100.
1674	101.	1683	108.
1675	86.	1684	152.
1676	84.	1685	112.
1677	66.	1686	129.
1678	83.	1687	110.

From whence I think the probability, at leaſt, of my *Æra* may be inferred, whatever may be thought of

of the notions that are brought to give a reaſon of it. For the great increaſe of number in the year 1684 muſt evidence that; and it ſeems obviouſly deducible, that as ſome great and general cauſe from the conſtitution of the ſeaſon muſt influence ſuch accidents; ſo that aſſigned, from the Coldneſs, may have that energy here; ſince both 'twas ſo remarkable, and nothing elſe appeared (either upon my own, or any others obſervation or notion, ſo farr as I have yet learnt) fit to ſtand in competition with it. And from comparing the accounts of the ſubſequent years with thoſe which went before, there ſeems reaſon enough to ſuppoſe, that ſince the indiſpoſition laſted (but in ſomwhat a lower degree) though the external occaſion have ceaſed, the weakneſs impreſſed on the *nervoſum genus*, according

according to what has been before deduced, is not yet obliterated. And indeed if we take notice of a diſeaſe of another denomination in the ſame papers (which by the dreadfulneſs of its ſymptoms is almoſt as evident as the *Apoplexy*) *viz.* the claſs of *Convulſions*, we may obſerve the effect of that impreſſion on the *Brain* to be ſo farr from vaniſhing, that it rather ſeems to be in the increaſe tho' the ſymptoms that declare it are altered: that claſs ſtanding thus.

An. Dom.	*Convulſ.*	*An. Dom.*	*Convulſ.*
1670 -----	1695.	1679. -----	2837.
1671 -----	1650.	1680 -----	3055.
1672 -----	1965.	1681 -----	3270.
1673 -----	1761.	1682 -----	3404.
1674 -----	2256.	1683 -----	3235.
1675 -----	1961.	1684 -----	3772.
1676 -----	2363.	1685 -----	3420.
1677 -----	2357.	1686 -----	3731.
1678 -----	2525.	1687 -----	3967.

So

So that though the flaceidity, impreſſed on the *Brain* from that occaſion, may be in good meaſure by this time abated, and unleſs the like, or ſome as forcible cauſes, happen again may, 'tis to be hoped, quite ceaſe (and I ſuppoſe it may be obſerved that the forementioned frequency of *Apoplexies* is a late ſomwhat abated) yet it may however have been ſo diſordered in its tone, as to make ſecretions of ſubſtances out of the alluent Bloud (which carries matter for thoſe of very many ſorts) which may become ſo diſagreeable to the nervous liquor, as neceſſarily to produce thoſe terrible ſymptoms, which tho' they kill not ſo immediately, yet many times prove as certainly fatal at long running. And the great numbers of vertiginous and other nerval indiſpoſitions, which I preſume

ſume other Phyſitians as well as my ſelf uſually meet with, may very well argue ſome conſiderable indiſpoſition impreſſed on the *Brain* more of late than formerly which muſt give a riſe to them. And indeed if we obſerve it we may find (at leaſt I have) that moſt *Feavers* of late years, and even at this time, have been attended with nerval Symptoms, as either *Tremors* or *Convulſive* motions in the *Tendons*, or elſe *Comatous* affects, *Deliria* (for the moſt part ſlow) or ſome others of this original: And the Symptoms mentioned by that moſt curious obſerver of the changes of diſeaſes, my Learned and Worthy Friend Dr. *Sydenham* (in his *Schedula monitoria de novæ Febris ingreſſu*) to diſcriminate the *Feaver* of this new Conſtitution from thoſe foregoing, are obviouſly thoſe of the *Brain* or Nerves

affected as may be easily collected by those that cast their eye on the History of it he layes down.

So that the notion is not to be restrained to *Apoplexies*, but ought to be carryed farther to many, if not most, other nerval indispositions, which I conceive, may be occasioned by the same general cause. For if it be determined to act on the *Brain* to its weakning (as I have endeavoured to demonstrate intense Cold is) the constitution of it and its appendices, being very much differing in several persons, it must follow, that diseases of various kinds and denominations may happen, according as the organization of either the *Brain*, or the *Systema Nervosum* (which may be possibly concluded to be the whole Body, except the liquors and *Parenchymata*) happens to be different in some from what it

is

is in others: And indeed the *Brain* in all persons, who have even the most firm constitution of it, being yet of too tender a one to resist all impressions made by so powerful a cause as the forementioned disposition of the Air was; & being so hard to be restored when once injured; & if that be not fully done, easy to be afresh affected even by much less powerful causes of many other kinds, which frequently happen upon the various mutations of the Air; 'tis no wonder that the Bills should be so filled with Convulsions, aswell as that other nerval indispositions should now adays so much invade.

But in relation to the numerousness of Convulsions (mentioned, as I said in the weekly Bills) it being objected that their fatality happens, probably, most to Children; which, having been born since that frosty

winter, cannot be presumed to have been influenced by it; I answer, first, that the supposition is precarious, since the Bills make no such distinction; so that it may be not altogether improbable that though that mortality may have been most among them, they being the fittest subject of such diseases, yet adult persons may withal have gone to make up the number of the increase: and I see no reason but that since it must be acknowledged some elder persons have before that time dyed of this disease, they must proportionably contribute to the number now, unless the contrary can be shewn, or else some more probable cause assigned, than what I am going to give, why more infants must dye of it now than formerly. For, secondly, there seemes reason that parents who have received a morbid impression

impreſſion on a part of that conſe-
quence, that the *Brain* is, to the
production of ſeminal matter, and
thence the formation of the *Fœtus*,
as to the neceſſary functions of their
proper life, may propagate that to the
children they beget or bring forth,
as well as diſpoſitions to the *Gout*,
Stone, *Conſumptions*, or other con-
feſſedly Hereditary diſeaſes; which
too, are moſt of them nervall. And
this impreſſion on the *Fœtus* muſt,
in probability, happen principally
on that part of it, which being chief-
ly influential on the reſt of the body
muſt have its Stamina laid as ſoon
as any other parts if not before them
all: which too from the congruity
of ſubſtance this has with the analo-
gous part in the parents, which has
the principal effect in the produ-
ction, may be ſuppoſed to be princi-
pally affected in the Child. And the

Brain having been weakned in the Parents, the reaſon ſeems more over much ſtronger for the production of theſe than any of the owned *Hereditary* diſtempers, if the Parents have ever formerly had *Convulſions* (which very many have whileſt Children, as is generally obſervable; and I ſee not but that this is ſufficient to make and denominate the ſame diſeaſe, in the Child that ſprings from ſuch perſons, *Hereditary*) ſince here is ſo powerfull an operating cauſe ſuperadded to a ſeminal debility and impreſſion.

But 'tis objected by a very ingenious perſon againſt the *Æra* I aſſume, 1*ſt*, That the increaſe of *Apoplecticks* in 1684 being but 44 above the number of thoſe that dyed of that diſtemper in 1683 is too ſmall an increaſe to be taken notice of for eſtabliſhing it; 2*ly*, That there have

been

been two or three great Frosts within the 18 years I mention, without any observable increase of *Apoplexies*; 3*ly*, That (against my suggestion of the great increase of *Convulsions*) 'tis notorious that any one, that has but the least *Spasme* before death, in the Bills dyes *Convulsive*, besides those that dye of other distempers, particularly the *French Pox*, whose credit their Friends are willing to save, and so give them in as dying of *Convulsions*.

To the first of which objections I reply, 1*st*, that I thinke 'tis not the number of the increase *in general*, but the *proportion* to that of former years that ought to be considered in this matter. For though the number in it selfe be but small, yet comparatively to the rarity of the distemper I take it to be so considerable, that few diseases flowing from the

the Anomaly of ſeaſons on account of the firſt qualities, except *Feavers* (which ſomtimes, I conceive, prove epidemical, even without what we call Malignity) exceed it; being not much under a third part more than that of thoſe that dyed the foregoing year, and by much more than a third exceeding that of ſeveral of the years cited, and more than double the number of thoſe that dyed in ſome of thoſe years. So that there is to me a great deal of reaſon to think the *Cold ſeaſon* influenced that increaſe unleſs ſome fitter cauſe can be aſſigned. 2*dly*, That thoſe diſtempers that lye in the *nervoſum genus*, *viz.* the ſolid ſubſtance of the Body (or even in the root of it, the *Brain*, whoſe texture yet is finer and more tender than that of all the reſt of it) or in the Liquors that are contained and carried in it,

being

being ſeated in a matter leſs *Heterogeneous* and more removed from the briske agitation impreſſed by the Heart, as they are more difficult to be introduced, ſo a ſmaller exceſs in the number of them amounts to a greater proportion comparatively, than where there are thoſe ready cauſes of a commotion, as there are in the diſeaſes which are generally called *Epidemical* (as maligne feavers, pleuriſies, angina's, *&c.* from the indiſpoſition of the ſeaſon.) For theſe being ſeated in fluids which are very *heterogeneous* and *laxe*, and agitated not only with a fermentative but brisk circulatory, and thence very confuſed, motion, are therefore eaſily put into diſturbances from external morbifick cauſes; the matter of which, if active (as there are particles enough amongſt thoſe we converſe with

with that are) may eaſily inſinuate into the Bodies of moſt perſons, eſpecially thoſe who are not of a very vigorous conſtitution, and may thence excite feavers in them ſo determined in their ſymptoms, as this matter is diſpoſed to affect; whereas thoſe that are founded in the *nervoſum genus* require, on the ſcore of the mentioned conditions, a long continued action of the morbid cauſes, to induce thoſe impreſſions that muſt occaſion them. From whence,

(To anſwer the *Second* objection) it ſeems to me no wonder that none of the *former Froſts*, referred to in the objection, ſhould introduce diſtempers (though perhaps of the nature, yet not) of the number of thoſe under conſideration. For none of thoſe in my memory; nor, ſo farr as I can be informed, in that

of

of any man, were either ſo violent or long laſting as this, and conſequently the degree of debilitation impreſſed by them, could not be ſo great either on the *Brain* or Bloud. But perhaps, if a due examen were made (which I have not the opportunity now to doe) it might be found that nerval indiſpoſitions of other denominations may have ſucceeded them, anſwerable to the degree of the impreſſion. However this impreſſion (which, I conceive, from the grounds before laid down, muſt be ſomwhat) having not been obliterated (which it may not perhaps in many years) when this great one invaded, might facilitate the effects of it, which without ſuch a *procatarxis* might have been the leſs influential on our health.

But as to the third objection; I conceive 'tis no more than what may

may be urged againſt that ſymptom in the Bills from their beginning. For I doe not think that either the ſearchers, or others who give them the account, were more skilful formerly to diſtinguiſh between thoſe diſtempers we call *Convulſions*, and *Caſual Spaſmes*, than now. And why there ſhould be more of this latter kind now than formerly, I cannot conceive, unleſs they be the effects of true *Convulſions*. So that I ſee nothing but that the aſſigned compute may hold good; eſpecially ſince the increaſe is ſo very great that nothing but a real fixed cauſe can introduce it. And as to what is urged of the *French Pox*, *&c.* being put in under this Claſs, the anſwer is the ſame, ſince the ſame reaſons have always been for the concealment; and 'tis known the *Pox*, and its infamy too, has been con-

ſiderably longer in the world than Weekly Bills, which are not of an Hundred years ſtanding.

From theſe conſiderations put together, you ſee my ſence of the queſtion propoſed; to which I am ſure you expected not ſo tedious an anſwer. And I aſſure you I deſigned not this prolixity: but ſeveral deductions ſtill falling in which to me ſeemed requiſite to clear the notion, I am ſure you will not expect apologies for my doing that which your ſelf have occaſioned.

But ſince you farther require the methods of Prevention and Cure of this diſtemper, which I have either uſed or think requiſite; Though after what ſo many Authors, and particularly Dr. *Willis*, have written on this ſubject, it ſeems altogether ſuperfluous to ſay any thing; yet, to let you ſee how ready I am to comply

ply with you in this as well as your other desire, I shall venture at least to give you my thoughts in general concerning them; together with my reasons, such as they are, of the administrations to be proposed, to justify my dissent from such, who in any of the particulars think differently from me.

But first, though not pretending to write an exact treatise of *Apoplexies*, but only to give an answer to your questions, you are not to expect I should congest Prognosticks, according to the custome of Authors when they propose to write solemnly concerning any diseases; yet I conceive 'tis requisite I should lay down, or rather recapitulate, one or two that respect the fatality: more indeed to excuse Physitians (who are generally liable to be taxed if success attend not their endeavours)

vours) than for any ſolid and uſeful information they can bring; ſince the cauſe of it cannot be certainly known but upon diſſection. And

Firſt, if an *Apoplexy* proceed from any conſiderable effuſion of bloud in *Specie*, 'tis, as I intimated before altogether incurable, ſince the tenderneſs of the part is ſuch that it cannot reſiſt the force of the portruſion behind. And ſince even any ſtop in the Sanguiferous veſſels will, if not preſently removed by Phlebotomy or other due remedies, ſo diſtend them that either an eruption or ſtagnation muſt quickly follow, 'tis not at all to be wondred at that ſo few eſcape; ſince ſo few are convinced of (what I take to be) the true remedy where there is a poſſibility of recovery.

Secondly, that likewiſe which proceeds from a *Polypus* muſt needs prove

prove as fatal, both from the difficultly diſſoluble nature of that ſubſtance, and the ſhortneſs of time medcines (if ſuch there were) that ſhould effect the diſſolution, are allowed to exert themſelves in: the bloud, as I juſt now ſaid, for want of motion quickly ſtagnating and growing grumous in any part where 'tis ſtopped, and ſo hindring the motion of, and alike affecting, the reſt.

To which yet, thirdly, give me leave to ſubjoyne; that if the Pulſe continue any thing ſtrong, the probability of recovery is much the greater, ſince 'tis an argument the *Brain* is not wholly overflowed, but that the maſs of bloud yet continues in its channels, and produces the diſtemper only by diſtention: ſo that when they ſhall by due adminiſtrations be freed from it, there is hope the *Brain* may return to its priſtine

priſtine condition; at leaſt in ſome degree. But yet,

Fourthly, that thoſe who have eſcaped one fit, are in very great danger of a return; ſince (as I have before alledged) the *Brain*, having been once injured, is, by reaſon of its tender make, ſo difficultly reducible, in all reſpects, to its former Tone; and therefore from any, even ſlight, occaſion be afreſh more eaſily diſordered. Therefore it very much concerns thoſe who have once eſcaped that danger, or even that of a great *Vertigo*, or other *Cephalick* diſtempers, to uſe a good regulation of themſelves for the future, and alſo to perſiſt long in the uſe of ſuch corroborating means as may at laſt (*Deo annuente*) perfectly reſtore it, as well as keep the bloud in a due craſis, and prevent all antecedent cauſes. Which advice yet very few

are apt to follow; two many being apt, when once in ſome degree recovered, to imagine (and ſuggeſt too) that Phyſitians urge that more for their owne advantage than theirs.

Which premiſed, I conceive, firſt, for Prevention, that theſe two general Indications ought to be propoſed. The removing the Antecedent cauſe, and the corroborating the *Brain.*

The former is to be anſwered, 1*ſt*, by general evacuations of humours, whether Laudable, if they be congeſted in too great a quantity, or Peccant: 2*ly*, by keeping up, or, if it be depraved, reſtoring the bloud to its due craſis.

1*ſt*. As to evacuations; *Phlebotomy* ſeems to deſerve the firſt conſideration; ſince, as I have endeavoured to make it out, 'tis either the congeſtion of the bloud in the ſanguiferous

guiferous veſſels of the *Brain*, or its inundation upon it, that is the moſt general containing cauſe of it. So that all perſons of a Plethorick habit of Body if fearful of this diſtemper (Fear, by occaſioning the contraction of the *Brain*, the ſeat of our apprehenſions, if not determining the bloud to it, at leaſt cauſing a check of its motion through it, and ſo a congeſtion in, or effuſion out of, its veſſels) as well as thoſe, whoſe bloud, from other ſymptoms, or the emiſſion of ſome of it, may be collected to be viſcous, eſpecially if they happen, with diſtention of the Veines and Laſſitudes, to be vertiginous, or inclined to pains in the head, ought to take ſo much away as may, in probability, prevent too great a diſtention here, and this not only at ſuch times of the year, when the bloud is more apt than uſual to

riſe into a Turgeſcency, as in the Spring and Summer, but at any time when they occaſionally find it to be ſo diſpoſed. And though many may (& are indeed uſed, to) urge, that not letting bloud at all they have hitherto eſcaped this, as well as other diſtempers, when ſome have been ceaſed, and dyed too, notwithſtanding ſuch their care (which argument too, by the way, may be urged by many of vigorous conſtitutions againſt all precaution, againſt all diſeaſes, and for a liberty for all debaucheries.) Yet ſince many have fallen into it, who might probably by Phlebotomy have prevented it, as well as that many have by it found preſent relief when actually ceaſed 'tis but a ſecure caution to uſe the moſt probable meanes of prevention; ſince though all conſtitutions are not alike, and ſome may be ſenſible

ſible of weakneſs for the preſent (which yet quickly goes off by a little ſubſequent care) yet experience ſhewes there are very few but find, though they looſe very large quantities of bloud, they quickly regain it, as (to omit the reaſons of it, as leſs proper for this place) beſide abundance of inſtances that might be brought of thoſe, who, free from the too general apprehenſions of the danger of looſing it, have had it deſignedly taken away in large quantities, Spontaneous Hæmorrhages, and thoſe from large wounds, might convince perſons unbiaſſed by their own, or others, unaccountable fears. Therefore I ſhould propoſe that any perſons who dread this diſeaſe, whoſe bloud has not been depauperated by preceding ones, eſpecially if their appetites be generally good, and they uſe not ſtore of exerciſe

(filling their veins by the one, and not taking care proportionally to empty them by the other) ſhould take away bloud at leaſt every Spring; though oftner if occaſion require; and much the rather if they accuſtom themſelves to (that frequently fatal cuſtome of) much drinking of Strong liquors; ſo to keep both the ſanguiferous veſſels from too large a diſtention, and the bloud more calme. Twenty ounces I take to be about a middle proportion for moſt to looſe; which may, I ſuppoſe, bear the proportion of about a twentieth part to that in moſt Bodies, and not very much leſs in moſt, and I believe can do none (under the forementioned circumſtances) any hurt, but much good to moſt, by ſecuring them from the danger of this, as well as many other diſtempers.

Beſides

Besides *Phlebolomy*, I take moderate *Purging* to be requisite, in order to carry of viscid and other humors that, from the foresaid impressions made on the Bloud as well as the *Brain*, are apt to be congested; especially in the Bodies of sedentary persons. This may be done usually Spring and fall; provided that it be neither attempted with too violent medcines, nor too long continued, nor too oft repeated (which ill custome yet many *Hypochondriacal* persons, I have met with, will not be dissuaded from) least instead of taking a way the *luxuriant* humors, these medcines, by too much exagitating and disturbing the Bloud, introduce the distemper they are given to prevent. But if the stomack be oppressed, 'tis requisite it should be discharged upwards before medcines of the contrary

trary tendency be given; ſince *cathartick*s, as they can only carry a way thence a ſmall part of that clogge that cauſes the ſymptom (their irritation not being ſufficient in compariſon with the *emeticks*, to make it contract it ſelf for a total diſcharge) ſo may likewiſe take a long with them part of that into the Bloud; in regard they themſelves muſt be carryed into it by the way of the *Chyle*, to effect the ſeparations of thoſe ſubſtances, we find they occaſion a diſcharge of, from it. And indeed the effects of vomiting are very extenſive towards the preventing theſe as well as many other, eſpecially nerval, diſtempers. For beſides the freeing the ſtomack from any oppreſſing matter which 'tis very apt to congeſt, and which, whilſt lying there perverts digeſtion, by either hin-

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dring the eruption of, or allaying, or elſe depraving the liquor deſigned to exude out of the glaudulous coate of it into the cavity, which I ſuppoſe to be the principal digeſtive ferment: ſo that digeſtion being, by the removal of this matter, rightly performed, from the depravation of which moſt diſeaſes ſpring, the cauſe of them is thus cutt off; I conceive the irritation, and concuſſion, made by an emetick upon the nerves not only belonging to the ſtomack, but (by the conſent of the whole nervous ſyſteme) all the Body over, and upon the *Brain* it ſelf, muſt occaſion them to contract themſelves to the diſcharging of whatſoever fills, or is diſagreeable to them.

Evacuations by Urine may be likewiſe procured by thoſe who are of a groſs habit of Body, or whoſe

Bloud

Bloud is of too close a texture or too viscous; and may be used by such familiarly (premising those forementioned) either by impregnating drinks for common use with *diureticks,* of which practical Authors have store, or by taking fixt, volatil, or acid salts (all which are *diuretical* in relation to some or other constitutions) or other more complex ones, as the particular constitution of each person requires, even with our common meats and drinks; they, if fitted to the several *dyscrasies* (for all are not proper for all indiscriminately; those who abound with acid humors needing alcalizate salts, either fixed or volatil to retund them, or others of an analogous effect; as others whose Bloud, by reason of its too highly exalted sulphureous parts, is apt to be overmuch exagitated, as also

alſo thoſe in whom even the volatil ſalts are too brisk and acrimonious, require acids to mortify them) raiſing generally no commotion in our Bloud, but diverting the courſe of it from the *Brain* which 'tis too apt to take. For partly by the congruity their particles have to the ſecretory paſſages in the Kidneys, in order to enter into and open them more than thoſe in the other ſecretory parts; partly by the fuſion they make of the Bloud, and the reducing many parts of it to ſuch bulkes and figures as fit them to enter likewiſe; partly by their action upon the nerves and their liquor (which I ſuppoſe to be the determining ferment in all mixt ſecretions) on the account of their angles, which fit them to vellicate and incide, as alſo to accelerate the motion of any liquors they come

to

to be mixed with; partly by abſterging, from that inciding power, any obſtructing matter, that may lye in the habit of the *Brain*, as well as any other parts, between the extremities (or term of denomination if they are but continued veſſels) of the arteries and veines; they may very well, I conceive, both make the Bloud more apt to circulate more univerſally, and alſo direct the courſe of it to the Kidneys, in regard ſome parts of it being continually, and more copiouſly than uſual, thus taken off from it, the reſt muſt take its courſe, from other parts where 'twas apt to ſtop, hither: it being known that it flowes moſt thither, where it finds apertures fit to let it, either in ſpecie, or any of its parts goe forth.

Thoſe evacuations likewiſe by ſweat may perhaps be ſomtimes attempted

tempted with due caution; but neither indiſcriminately by all perſons, not at all times; and require more than moſt others the judgment of a *Phyſitian* to regulate them. For if medecines to procure it be given when the Bloud is of a texture not open enough (which both frequently it is, eſpecially near the beginnings of moſt diſtempers, and which all perſons are not judges of) or when too *heterogeneous* ſubſtances abound in it, they diſpoſe it many times more readily to fix upon the *Brain* and nerves, than to part with its noxious particles at the deſigned ſecretory parts; and a briſker motion being thence impreſſed on it, the confuſion of its parts muſt be increaſed; and ſo if not an *Apoplexy*, yet other diſtempers, as certainly, though more ſlowly, deadly (at leaſt very dangerous and hard

to

to be removed) may be introduced. But this ill cuſtome of forcing meats (whether by inward medcines or outward application) being ſo common nowadayes; as I am ſatisfyed that to this regulation are owing many contumacious diſtempers which by calming, inſtead of exagitating the Bloud a little diſturbed, would quickly have gone of, ſo 'tis fitting that thoſe ſhould be admoniſhed of the ill conſequences of ſuch a method who, (I will beleive) out of charity (which yet would be more fitly employed otherways) adventure upon it, eſpecially near the beginning of feaveriſh indiſpoſitions, before the morbifick matter is digeſted, and fitted to ſecede; as well as the multitude of pretenders to *Phyſick*, who without a due knowledg of the grounds of *Phyſick* (which thoſe that

that induſtriouſly ſtudy it, know are not eaſy to be attained) make this their ſacred anchor when they know not what to doe.

Another ſort of evacuations for prevention may be propoſed, *viz.* By Fontanells. But though theſe look ſpeciouſly, and many are fond of them, and indeed they may be poſſibly uſeful to ſuch who have eſcaped out of one fit, as a conſtant draine, to divert ſome humours from the *Brain,* which, by too much relaxing, or otherwiſe indiſpoſing it, might occaſion returns; this part requiring thence, as I have deduced, a long time, and diligent regulation, to recover its native tone, and ſo may need all manner of diverſions as well as other aſſiſtances: Yet to perſons, free from other indiſpoſitions that require them, I ſhould think them, if not

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in ſome degree prejudiciall, by drawing away ſome part of what ſhould be retained, at leaſt ſuperfluous, the humour evacuated at them bearing uſually but a ſmall proportion to the dayly ſupplyes brought into the bloud, which therefore may become much depraved for all the aſſiſtance theſe can give; eſpecially in regard the evacuation is not of a peccant humour in general, but made up of any ſorts of particles that can get out of the apertures of the divided veſſels, and much different from what is of natures deſignation in parts fitly by her Organized upon the firſt conſtruction. (For I cannot conceive it otherwiſe elective, than as thoſe apertures, which on the ſcore of the Inciſion, or Eroſion of the Veſſels muſt be large, can only diſcharge ſome ſuch, ſufficiently for the moſt part complex,

plex, ſubſtances from the bloud as are of a bulk and figure commenſurate to them or leſs, without any relation to them as diſagreeable to the reſt of the maſſe; and ſo from that largeneſs of the apertures there muſt be tranſmitted a much greater number of uſeful, than truly excrementitious, ſubſtances.) To ſay nothing of the diſturbance which the pain muſt occaſion in a Body otherwiſe ſound. Whereas moſt of the uſeful evacuating adminiſtrations (except Phlebotomy, which produces its effect mainly by the quantity 'tis uſed in) make, or preſuppoſe, a laxity, and ſeparation of parts, in the ſubſtances from whence the evacuation is to be had, as well as effect it at emiſſaries fitly framed and diſpoſed to let go ſuch or ſuch determinate humours.

Secondly; As to the corrobora-

ting the Crasis of the bloud: Though those who are in perfect health need it not, and medecines of that tendency may perhaps make it ferment too highly, and so perhaps occasionally introduce the distemper which the pretext of giving them is to prevent; yet to valetudinary persons, or those whose bloud, upon emission, appears viscous, or is otherwise depraved, I suppose such administrations are very necessary. And to such I would (universals premised) propose a course of bitter medcines, both at Spring and Fall, if they are of cold and Phlegmatick constitutions; as I would advise others, whose bloud is too apt on light occasions to be exagitated, the familiar use of appropriate calming medcines. But to all, Chalybeates (to be diversified, and given with different vehicles, according to

to the ſeveral conſtitutions of perſons) may be of moſt extenſive uſe; and have this to recommend them, that they need no ſtrict regulation, nay their effect is depreſſed by confinement; ſtirring and changing the Air both actuating them, and exciting and fermenting the bloud, as alſo ſtrengthning the tone of the parts. Of theſe, the Chalybeat waters, as thoſe of *Tunbridge*, *Aſtrap*, and (which, I believe, is ſecond to none) *Ilmington* in your neighbourhood, and the like, drank in Summer (and perhaps at other ſeaſons, but that cuſtom has not authorized it here; though *Henricus* ab *Heers*, as great a judge of that as any man, in his *Spadacrene*, Preſcribed them with as good ſucceſs in the midſt of Winter as at any time beſides) for a month or longer, are, as the moſt familiar, and confirmed by the pra-

ctiſe of the greateſt Phyſitians of many ages, ſo perhaps the moſt efficacious of any preparation of Steel, as being taken up by the water running through the Minera whilſt the mettal is yet in *ſolutis principiis*, as the Chymiſts ſpeak, and ſo moſt ſubtil and active; if ſo be the *Brain* happen not before to have been too much intenerated: in which caſe perhaps the water it ſelf, Symbolizing with the indiſpoſition (eſpecially the quantity conſidered) may predominate over the power of the Vitriol, diſſolved in it, to conſtringe the before weakned part. And the diverſion to be uſed at the Wells may not a little conduce to the effect of rectifying the bloud, by exciting the Spirits.

But as to the ſeveral Chalybeate preparations, give me leave ſo much to digreſs (if you will call it a digreſſion)

greſſion) as to ſay, that I think, if the parts of our body and craſis of the bloud are only to be ſtrengthned, and no ſtore of *Acids* abound; thoſe of them that have been opened by *Acids*, and ſo reduced to a Vitriol, are moſt uſeful; ſince they may eaſily and immediately be diſtributed, without the trouble given to Nature (which is not always able to actuate a ſtubborn medecine that needs a ſtrong key to unlock it) farther to prepare them to be fit to enter into the receſſes of the body. But if *Acids* abound in us, the judicious D^r. *Sydenhams* method of giving the brae limature, unaltered (for I believe his Extractum *Abſynthii* can have little of the effect of an *Acid* upon it) muſt be the moſt prevalent of all; ſince both the intentions, *viz.* of abſorbing *Acids*, and then ſtrengthning the craſis of

the bloud, and the tone of the parts, are by it anſwered; the *Acids* in the Stomack proving perhaps as fit a menſtruum for making a Vitriol, for thoſe uſes, as thoſe in the *Chymiſts* hands; whereas the intention of abſorbing, if it have place, can hardly be ſatisfied, if the medecine have been before ſatiated. And indeed *Acids* being apt to be ſo predominant in us, eſpecially in *Hypochondriacal* diſtempers, which are ſo very frequent (as not only very common eructations and vomitings of that kind, but the effect of Urinous Salts, teſtaceous medecines, the uſual antiſcorbuticks which are generally found to abound with volatil Salts, and other obſorbers of *Acids*, evince; beſides the rationale of ſuch diſtempers which is ſpecioufly deducible from the predominancy of *Acids*) that great perſons propoſal of

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it in that, though groſs, yet frequently very effectual, preparation ſeems to be the moſt univerſally ſolid: though, as I ſaid, if *Acids* abound not, the others, I ſhould think, would be the moſt effectual.

The ſecond general Indication, The *Coroborating* the *Brain*, may be anſwered in a great meaſure by the laſt mentioned adminiſtrations, *viz.* the uſe of *Chalybeates*; whoſe effect is generally owned to extend it ſelf to all the conſiſtent parts in the Body, as well as the bloud; nay muſt more to thoſe, than this: ſince their action upon this is but tranſient; but thoſe may be preſumed to arreſt and detain them, though not all, yet as many as their Pores can conveniently receive. For not only their Vitriolate particles, but alſo the groſſer ones, which remain after the abruption of thoſe (as in

Crocus

Crocus Martis Aſtringens, which is made by the avolation of the Vitriol, upon a long and intenſe calcination) are confeſſedly ſtyptical; and therefore being carried in circulation (as well as acting on the Nerves in the Stomack) to the remoteſt receſſes in the Body and amongſt them thoſe in the *Brain*, may be preſumed by their lancinations, as forcing them thereby to gentle contractions, to rectify their tone, when too *lax*, which I have ſuppoſed before to be a main condition toward producing the diſtemper under conſideration: And this faculty they muſt moſt exert upon thoſe parts whoſe indigencies are greateſt; thoſe whoſe tone is firm not being fitted to receive, or at leaſt be affected by, them. So that when the *Brain* has been debilitated, they muſt exert that action principally there. But

But beſide theſe, a frequent uſe of the generally owned *Cephalicks*, as *Roſemary*, *Sage*, *Betony*, *Lilly* of the *Valley*, *&c.* may poſſibly much conduce to corroborate the *Brain*; and may, without trouble or offence, be uſed in the Form that *Tea* is; the general cuſtome having denizon'd ſuch a uſe of drinks: and thoſe whoſe apprehenſions are greater, might beſides have thoſe Ingredients fermented with their uſual drinks.

But amongſt all the drinks in common uſe (if you will not ſuſpect the Character given by one, who loves it ſo well, as you know I doe; but who withal have dranke it near thirty years, not only innoxiouſly, but, I ſeriouſly affirme, many times to my great advantage, eſpecially when indiſpoſed either at my ſtomack or head) that of Coffee may perhaps contribute as much to a

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prevention of the distemper as any; and that on a double account. *First* by helping the stomack to digest, which it may effect, partly by reason of a gentle *Stypticity* the particles which make the *Tincture* have, from the torrefaction of the berries; partly from the actual heat 'tis usually dranke with; both which (but more effectually when conjoyned) conduce much to corroborate the tone of it; so that digestion being well performed here, and good Bloud thence produced, much of the antecedent cause both of *Apoplexies* and other distempers must be by such administrations prevented: *Secondly*, by the action it performes, I conceive, on the *Brain* it self: for, by means of the moderate torrefaction, the *aqueous* parts of the berry are carried away, and the viscous are altered in their texture; whereby

whereby the ſulplureous and ſaline (I diſpute not whether preexiſtent, or made by the preparation, upon the alteration of texture) aſſociating with the terrence, come to conſtitute little irregular maſſes, which are not immediately diſſoluble (however thoſe particles may be in a tendency to avolation too, by reaſon of their not very ſtrict combination) but when diluted in the water, after the known manner of preparing the drinke, may be preſumed to be carryed through the maſs of Bloud in circulation to the *Brain*; and there, entring into the pores of it, both keep them open for a free paſſing of the ſpirits; and withal (eſpecially if daily but moderately, uſed) keep up the due tone of the *Brain* by the gentle vellication ſuch particles may make upon it; by which laſt means it becoms,

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I conceive principally uſeful in the preſent inſtance. Therefore (for I will not appropriate it to all) it ſeems to me (agreeably to Dr. *Willis*'s notion, *Pharm. rat.*) moſt proper for thoſe who have too lax a conſtitution of the *Brain*, as whoſe intellects or memories generally are ſlow, and who are much given to ſleeping, or to have a dull pain in their heads, eſpecially upon free eating and drinking, or ſuch as are apt to vertigoes from to *humid* a conſtitution, or to *Catarrhs*. But 'tis ſcarce proper (that you may ſee how little partial I am) for ſuch as are of an overwatchful temper, of very keene apprehenſions, with a thin habit of Body (though I have known ſome of that habit with whom it has very well agreed: and that obſervation of agreeableneſs ought, by prudent perſons, to be con-

conſulted, not only in relation to this, but moſt other medecines and even meats, ſince experience ſhews that, from undiſcoverable, or at leaſt from our ſhallow inſight into things undiſcovered, cauſes, very probable adminiſtrations ought to be ſuperſeded, as well as the contrary uſed) and withal for thoſe that are apt to convulſive ſymptoms upon light occaſions (though, I conceive, where, beſides the irritative matter that makes convulſions, there happens too great a laxity of the *Brain*, Coffee, by fortifying the one, may in great meaſure prevent the admiſſion of the other.) All which to me ſhew the *nervoſum genus* to be of a texture, in ſuch perſons, conſiderably compact, and comparatively dry, with which theſe particles may too much correſpond: and it may be obſerved that ſuch perſons

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many times contract an unſteadineſs or numneſs of their hands and other parts, as well as a general indiſpoſedneſs, and uneaſineſs by its (even, as to others, moderate) uſe. And from theſe effects upon the inconſiderate uſe of it (as 'tis common to have any, though the beſt, remedies abuſed when grown popular) it has amongſt many got the imputation of being a *Paralytick* drink, and diſpoſing to *Apoplexies*; ſuch never reflecting what multitudes of others, comparatively to the few it injuries, receive advantage by it.

Perhaps too you will expect my opinion concerning my other favourite, *Tobacco*. Concerning which I muſt ſay that though I know many have an opinion of its being *Narcotick*, or otherwiſe injurious to the *Brain*, and conſequently diſpoſing to *Apoplexies*: yet (to ſay nothing

nothing of my having uſed it, and not ſparingly, for many years, without finding any ſuch effect of it) the very common cuſtome of taking it for ſo many ſcores of years ſince it began to be in *vogue*, muſt have made ſuch a quality, if it had it, evidently taken notice of; and conſequently common prudence would have obliged people to have left it off long agoe, as deleterious, if experience did not evidence the contrary: for there is no man but, if, laying aſide prejudices, he will give himſelf the trouble to obſerve, may eaſily find, that very many live to great years, & in as great a ſtate of health as thoſe who take it not, that have long uſed it, even immoderately. It muſt indeed be owned that it is not agreeable to all conſtitutions: but the ſame may be ſaid of almoſt any thing elſe, whether food or *Phyſick*. And I

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preſume no wiſe man will conclude from a few inſtances of the diſagreeableneſs of any thing to ſome men, when vaſt numbers of them on the contrary ſide may be brought to warrant its uſe, that it ought univerſally to be avoided, or branded with a note of infamy. My ſenſe of it is, that in thoſe perſons with whom 'tis found to agree, 'tis a very good drainer of humors, and ſo may ſupply the place of *Fontanels*, or at leaſt that fewer of theſe may be neceſſary to thoſe who abound with moyſture. For, by its irritating and occaſionally (from the great *afflux* of the *Saliva*) enlarging the ſecretory ducts in the *glaudules* about the Mouth, as 'tis evident there muſt be a great diſcharge, ſo a great diverſion from the *Brain* (tho' I own the greateſt part of the matter comes not immediately from thence

thence but out of the Bloud) in which caſe 'tis adviſable that the perſons that take it ſhould drink but moderately; leaſt otherwiſe they do themſelves more hurt by the ſupply than they can receive benefit by the diſcharge of moyſture from this or any other evacuations. But there ſeems another reaſon why *Tobacco* may be uſeful to thoſe who are diſpoſed to *Apoplexies* (under the ſuppoſition of its agreeableneſs) *viz.* that by reaſon of the vellication the ſmoke of it impreſſes on the nerves in the Mouth, it makes them contract themſelves, and ſo by conſecution the whole *Brain* comes to be analogouſly affected. So that if the *Brain* happen to be more *lax* than ordinary, and thereby diſpoſed to receive an *afflux* of Bloud or *Serum*, as I take it to be eſpecially after a

perſon has had and eſcaped one Fit, as well indeed as in many other caſes of preceding nerval indiſpoſitions, I ſee nothing but it may prove a very uſeful adminiſtration, toward reſtoring the tone of it: and 'tis known to be very advantageous to many *Hyſterical* perſons; of which though perhaps other reaſons may be aſſigned, as the *altering the texture* of the Fermentative particles, by the aſſociation of thoſe of the ſmoke to them as they chance to be admitted, and ſo thoſe of other figures and bulks may hence emerge; or elſe the *determination of the nerves* to other motions, by the action of this ſmoke impreſſed on the *mammillary* proceſſes, or other nerves about the Mouth or parts adiacent; yet this ſeems to me none of the leaſt probable, that by *corroborating the tone* of

of the *Brain* it prevents the admiſſion of thoſe too *elaſtical* or otherwiſe *heterogeneous* particles into the tubes of the nerves, which are the cauſe of the ſymptoms.

Alſo the frequent uſe of Volatile Salts may conduce much to a prevention, under the limitations alledged for the uſe of *Coffee*; ſuch as are ſpirits of *Sal Armoniac*, *Hartſhorne*, *Soot*, &c. (which are but ſuch Salts diluted) as being, I conceive ſo congenerous to thoſe called Animal Spirits, that they muſt needs excite them in us when too torpid, or ſupply them when wanting; unleſs the conſtitution of the Nerves be too dry or apt to be irritated by them. And their effects have, in many inſtances of nerval diſtempers, found been ſo remarkable, that they are now adays become

of very familiar uſe, though ſomtimes likewiſe abuſed.

But there are two ſpecious adminiſtrations, much cryed up, and uſed by many, which deſerve to be taken notice of, *viz. Apoplectick Balſams* (whoſe principal uſe is to be ſmelt to) compoſed of perfumes Aromaticks, and other ingredients, reputed Cephalicks, and Snuſh. Concerning the former of which, give me leave to ſay, I think them ſo farr from being uſefnl for prevention, that they moſt ordinarily prove very prejudicial. For by reaſon of their grateful ſmell and the great activity of their odorous particles (but without any troubleſom irritation) ſome of them may eaſily enough be preſumed to be admitted into the *Brain* at the extremities of the olfactory nerves with the Air in inſpiration; and being once ſo, are

are so farr from assisting it to contract it self, that, they much *relax* and *expand* it, and consequently dispose it to admit an *afflux* of bloud, especially when before fitted (as I have said) to be congested in, or make its way forth of, its vessels in the *Brain*. And their influence seems to me to be very great likewise upon the fluid substances in the *Brain*, which have all some lentor; and therefore these admitted substances, by reason of their activity, may easily exagitate them; whereby the passages must come to be enlarged, and so become capable of an *afflux* or congestion. I own indeed that, in some cases of *Headache*, they may be, and have proved a very effectual remedy; as perhaps when the matter that causes it may be acrimonious; but not in the degree or kind to produce con-

vulsive symptoms (all sorts of aculeated particles being not fit to produce one effect:) which the soft particles of these may, by their adhesion, so blunt or sheathe, that their lancination must therefore immediately be taken off. But as these cases are but rare; so also there ought to be a distinction made between the administration of medecines upon an emergency, and their common use when no cause requires it; which last the present caution refers too: for then there is reason to suspect they meeting with no hostile particles, may too much relax and open the pores of the *Brain*, and so give occasion to the suggested inconveniences.

If the experiment of convulsive symptoms (which imply contractions) ordinarily excited by these medicines in those who are dispo-

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ſed to *Hyſterick* fitts, be urged againſt this notion, which ſuppoſes the diſtemper under conſideration to proceed from a *laxity*; I anſwer, firſt, that it ſeems probable that theſe convulſive ſymptoms proceed from a kind of *Exploſion*, according to the ſenſe of Dr. *Willis*, which muſt firſt inferr an *Expanſion* of them, and then a contraction when the due requiſites to it concurr: for *Secondly*, the *Aromatick* particles, though of themſelves very ſoft, and agreeably entring at the pores of the nerves, yet finding, after their admiſſion, *heterogeneous* and fermentative ſubſtances in the *Braines* of ſome perſons, may be very much inclined from their congreſs firſt to agitate, and then in return be agitated by them; from whence the *Brain*, being *vellicated*, is forced into contractions to expel them:

them: upon which *lucta*, too, ſuch *corpuſcles* muſt, in probability be formed, as may prove very vellicating on a ſecond ſcore, and ſo continue theſe fitts, as being uncapable to be ſodainly expelled. Whereas when they happen to be applyed to perſons not abounding with ſuch fermentative particles, they may only *relax* the tone of the *Brain*, and ſo diſpoſe to *Apoplexies* on the forementioned account.

On the ſame ſcore, I conceive *Snuſh*, eſpecially made as 'tis uſually, with *Aromaticks* and *Perfumes*, and ſo mild (either on the account of its ingredients, or from frequent uſe) as not to cauſe *Sternutation*, to be prejudicial, inſtead of being advantageous, to the health of thoſe that immoderately uſe it, and more perhaps then the *Apoplectick Balſoms*: becauſe both the

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matter of it is more groſs, and thence apt to lye longer about the extremity of the *Olfactory nerves*, and ſo continually to affect them; and alſo the cuſtome of many is, as I have often obſerved, ever and anon to be ſupplying more, whereby the pores of thoſe nerves are kept continually open. And I muſt ſuſpect, that ſhould any *Peſtilential Seaſon* invade (which *God* avert) ſuch perſons, as much accuſtome themſelves to theſe pouders, would, *cæteris paribus*, be in more danger of receiving infection than others: ſince from the ſymptoms delivered by Authors, the peſtilence appears to ſeyze the *Brain* particularly; and the ſodain fate recorded of thoſe that, without any preceding indiſpoſition, have, whilſt that raged, fallen down dead in the ſtreets, ſeems not ſo eaſily accountable

table for any other occaſion, than that the peſtilential *Miaſmes* are admitted at thoſe nerves, ſince all other ways to the *Brain*, the ſource of ſenſe and motion, and indeed of all the actions of life, is the moſt likely ſeate of this ſodain proſtration. 'Tis true, it may be urged, that many which uſe it receive no apparent injury: and indeed ſome are of ſo firm a conſtitution of the *Brain*, as well as of the whole Body that comparatively great occaſions of ſickneſs will have little or no influence on them, whereas others are affected by very ſmall ones. But I think the objection may as well be urged (as on another ſcore I a little before intimated) by thoſe, who having long indulged themſelves in immoderate drinking have yet lived to a great age, when 'tis obvious that many more much ſhor-

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ten their Lives by it. But though not *Apoplexies*, yet *Vertigoes*, and other distempers which shew the *Brain* debilitated, may hence perhaps arise.

Secondly, as to the *Cure* of an *Apoplexy*; It consists (according to my notion before alledged of the Cause) chiefly in copious *Phlebotomy*, since nothing else seems capable of dislodging (at least *sodainly*: and this distemper of all others requires a *Sodain* remedy) the morbifick matter, For the distention, both of the Sanguiferous vessels, and habit of the parts, being by a good depletion taken off sodainly, the *Fibres* which constitute both must be presumed to contract themselves by their Tonick motion, but especially those in the habit; the Elastical pressure of the Ambient, as concurring ordinarily. So in this case especially when the

the reſiſtance within is abated. So that when what is neareſt the Heart runs into it with ſome impetuoſity, the reſt, both finding roome enough in the Veines, and being urged on, not only by the arterial bloud behind, ruſhing into the veins the faſter when it has more roome, but alſo by the Syſtaltick motion now the diſtention is taken off, muſt leave its former receſſes, and be reſtored to circulation. Which action is quickly propagated to the *Brain*, and that put into Analogous contractions. But this may be preſumed moſt effectually to happen whilſt the Veſſels are only diſtended before the bloud hath made its way forth into the habit of the *Brain*; which if it once hath, at leaſt in any conſiderable quantity, the diſtemper ſeems ſcarce at all remediable, either by this or any other adminiſtrations;

tions; both on the account of the forementioned difficulty, if not impossibility, of its getting out of those receſſes into the veines again, and alſo the yeildingneſs of the *Brain* to the Pulſifick protruſion of the bloud behind.

This Phlebotomy, I conceive, ought to be adminiſtred to Thirty, Fourty, Fifty, or Sixty, or perhaps more, ounces at a time (ſome perſons requiring more to be taken away, ſome leſs, according as the congeſtion and obſtruction happens to be greater or leſs, and the quantity of bloud to abound in the Body) if the Pulſe (which ſhould be tryed during the bleeding) fail not: Otherwiſe, conſidering the great quantity we have in our Bodies, 'twill not ſatisfy the indication. And by ſuch an evacuation, *viz.* to at leaſt *Sixty* ounces at once, D^r. *Gibbons* of *Oxon*,

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(a perſon whom you, as well as I, know to be, beſides his great parts, and general Learning, of that ſagacity, and judgment in Phyſick, that his example muſt much juſtify the practiſe) cured an *Apoplexy* there ſome time ſince, thought deplorable: as, if you queſtion the relation from me, you may be ſatisfied both from himſelf, and his Chirurgeon, and alſo ſeveral others that were preſent. And were it proper for me I could alledge *Analogous* inſtances of ſuch profuſe (if you will call them ſo) evacuations of that kind in my own obſervation, attempted with great advantage to my Patients. And if the firſt bleeding ſecure not the Patient, it ought after a few hours to be repeated, and ſo, if need be, ſeveral times: there being much more danger from the diſeaſe, than loſs of bloud, which has uſually been obſerved

obſerved to have been ſpent (as I a little before noted) upon wounds, or Spontaneous Hæmorhages, in much greater quantity without loſs of Life; and the conſequent weakneſs has ſoon been corrected by a due regimen of diet, or perhaps ſome other aſſiſtances. Nay even *Old Age* ought not to ſuperſede this remedy, however the aſſertion be like to be cenſured for very bold by many, who more conſult their own fears, than the reaſon of the thing. For beſides that ſuch antient perſons, who are inclined to *Apoplexies*, generally abound enough with bloud, theirs is more apt to grow viſcous from their decay, in ſome degree, of ſpirits, and their inability to a ſufficiently brisk action, requiſite to ſpiritualize, and keep it in a due craſis: ſo that when apt to diſtend, or get out of its veſſels, it ought to be

be taken away in good quantities, both in regard the decayed ſtrength of the part affected is not, proportionally to what it formerly was, ſufficient to manage it, and return it into its proper veſſels, or its uſual circulation in them; and alſo becauſe, if it be in them once grown viſcous, 'tis ſcarce poſſible it can be corrected for the forementioned reaſons; and therefore (according to the ſenſe of the deſervedly famous *Botallus*) ought to be taken away that better, from the ſupervening nouriſhment, may be ſubſtituted in the roome of it: the ſanguifying power, though upon a conſiderable abatement of the quantity, being in the reſt ſufficient, even in the eldeſt perſons, to tranſmute the appelling *Chyle*, which from its previous preparations (we feeding on nothing but vegetable, or animal, ſubſtances,

ces, which muſt be highly digeſted and exalted to be brought to either of thoſe eſtates; and thoſe farther exalted generally, either by Elixation, aſſation, or fermentation) wants little of the perfection of Bloud, even before its admiſſion into the maſs of it; as, if prejudices were laid aſide, might be collected from inſtances, which now and then occurr, of old people, who by wounds or *hæmorhages* looſe great quantities of it, and yet recover, nay many times increaſe, the vigor they had before theſe accidents: and I ſee no reaſon why, what nature or chance authorize to be innoxious, may not be attempted by art, when great indications occurr, which intimate how unſafe 'tis to permit them to goe unſatisfyed. And to countenance this opinion, give me leave to ſubjoyne (though 'twere

not hard for me to bring many more instances of this kind) that 'tis near two years since a very worthy Lady, the *Lady Yate of Harvington* in *Worcester-Shire*, of the age then of 77 years, was taken *Apoplectical*, and though the imminent danger of it were taken off before *Phlebotomy* was administred; yet it left so great a *vertigo*, and so general a weakness on the *Brain*, and all the Body (her *Ladyship*, though before very vigorous, considering her age, and endued with a very great understanding and memory, as all that have the honour to converse with her must testify, being reduced to the condition not to turn her self in her bed, besides a great decay of the intellectual faculties) that to comply with my judgment, and the duty thence resulting to my patients who put their lives under my conduct,

duct, I cauſed (aſſoon as leave could be obtained) between twenty and thirty ounces of Bloud to be taken away, with great, and immediate, ſucceſs: and the like was done again, in the ſame quantity, within a week after, upon a freſh incrcaſe of the ſymptoms, without any debilitation from it; but on the contrary with remarkable advantage, both in relation to her recovery of memory and underſtanding, and alſo ſtrength of Body. Since which time her *Ladyſhip*, uſing due medecines and regulation, has farther attained ſo great a degree of theſe powers, as at theſe years is much above the expectation of any that were witneſſes of her indiſpoſition.

I conceive indeed (to endeavour to evince a little the utility of *Phlebotomy* in ancient people; if you will not call it an excurſion) *Old*

Age to consist more in the Induration of the *Solid parts*, than in the absumption, vappidness, depauperation, or any other depression of the spirits in the *Fluids*; or what we call the *Humidum radicale*: for these fluids are daily repaired, and would be in as high a degree spirituous as ever (considering the previous exaltations just now mentioned) were the solid parts equally disposed to impress due motions on them, and the Strainers, and other passages, fitted as formerly for their transmission and *Secretions*. Whereas those once growing harder can neither undergoe their due contractive motions, as they were wont, nor thence sufficiently effect a division of the particles of these, wherein *Spiritualization* consists: only the finer and more spirituous (if agreeable) the substances are that are brought

brought to them by the Chyle, the more they must be a new intenerated, and so become more fit to perform their office toward the adapting these for the functions of life. And as to what concernes the celebrated notion of a *Humidum radicale*, which begins with our life, and continues individually the same, tho' in quantity diminished, and allayed (which diminution must on the same account, before it arrives at its utmost periods, cause *Old Age*;) I can hardly think that, Considering the comparative tenderness of our Bodies, the motions both of our Bloud and other fluids within us, and of the *Atmosphere*, that (in more than one sense) *unfathomable menstruum* for the dissolution of Bodies, without us, the daily supplies of *aliments* whose particles are sufficiently on the score of their texture agitable,

and the openneſs of the pores every where; any particles that conſtituted them at firſt can continue for any number of years, but muſt be all, one after another, in no long time thruſt forth as theſe cauſes come to act on them, to make way for freſh ones, that bring with them a ſutableneſs to the parts, which they, on thoſe accounts, muſt have loſt. For I cannot apprehend any other difference (according to the ſlenderneſs of my capacity) between the *Spiritus inſiti*, *Influentes*, *Humidum nativum*, if theſe be corporeal, as I know not 'twas ever doubted, and the Reſt of the groſſer ſubſtance that makes up the Body, than what depends upon the Figure, Magnitude, Contexture, and Relations thence reſulting: ſo that the more fine and ſubtil any of theſe ſubſtances are, I conceive they are ſo much the more

eaſily diſſipable, and therefore far from being ſo durable as the ſuppoſition of the *Humidum radicale* requires.

When therefore on any occaſion the Bloud; in thoſe who have this induration of the parts, becomes unapt to be duly moved as 'twas wont, it ſeems very requiſite that it ſhould be taken away in ſome ſuch quantity, as to render the motion of the reſt more placid (the diſtention of the veſſels being thus taken off) ſo to make roome for what is more fine, and apt enough to be quickly ſpiritualized, and to become a fitter matter for nutrition (and, if you pleaſe, ſupplyes of the *Humidum radicale*) whereby alſo that degree of rigidneſs of the parts, by the appulſe of this ſofter Bloud, may be corrected, and ſo, beſides the ſatisfying many times a pre-

a preſent and urgent indication, *Life* prolonged, if this adminiſtration were more frequently, but prudently, uſed, to a conſiderably longer date, than for the moſt part it has.

But to returne: If we make but a reflection on the quantity of bloud which very able Phyſitians have concluded to be naturally in our Bodies, *viz.* from about 16 to 25 pounds according to the bulk and conſtitutions of perſons; which, too, by full feeding, and want of due exerciſe, may poſſibly at ſome times be conſiderably increaſed; and withall how that many not only live under great faſtings for many days, whether for want of appetite or conſtraint, which (Evacuations proceeding notwithſtanding, at leaſt that of Tranſpiration, which, according to the obſerva-

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tions of the accurate *Sanctorius*, is much the greateſt of them all) muſt neceſſarily diminiſh the quantity of bloud much below the proportion that any Phyſitian by bleeding dares (though for reaſons not ſo proper for this place, and the brevity of a letter already ſwelled too much, the advantages thence reſulting in many caſes equall not thoſe of a free Phlebotomy) and yet afterwards recover to as good a ſtate of health as ever they enjoyed, we ought to lay aſide thoſe panick fears of a comparatively plentiful evacuation this way; eſpecially when the diſtemper ſeems hardly ſuperable without it: and a little delay and overſight in this point, as well as in war, puts the matter paſt retriving. I know large bleedings (nay even in *Pleuriſies*, *Peripneumonias*, *Anginas*, &c.) are much dreaded by many, not only

ly of the unconsidering vulgar, but even persons of all degrees, and education, and even by many Physitians of great name: And 'twere easy to cite great Authors, who have either expressed their fears of it, or so mince the matter, that their apprehensions are obvious enough: and he that frequently uses it cannot escape aspersions (*expertus loquor*) be the advantage to the patient ever so remarkable, and must expect, notwithstanding that, alwayes to be dreaded for a Physitian; but must at least be sure to be greatly censured, if, either through the greatness of the distemper, or the (very common unmanagableness of the Patient, either from his own inclination, or others suggestion, success attend it not. But certainly he must have a strict account to give who, taking charge of Lives, will, to their loss

or,

or, at leaſt, hazard, be rather ſwayed by others, or his own, fear than his judgment, but a much ſtricter, if a proſpect of Intereſt, by complying with peoples inclinations (which I am afraid is too common amongſt pretenders to Phyſick) tempt him to deflect from it. And therfore he ought not be concerned at theſe *Bruta Fulmina*, but follow the dictates of his reaſon and conſcience. For my own part, though I am farr from thinking Phlebotomy proper for the cure of all diſeaſes, or even to be largly adminiſtred in moſt, but that a ſolid judgment (which I am ſure the greateſt number of the cenſurers of it have not) from ſubſtantial grounds in Phyſick, ought to determine when it is to be adviſed, and when not; yet I think it might be more frequently, and in many caſes much more copiouſly uſed, than (at leaſt in

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the place where I live) it is or will be permitted to be: And I ſhonld be obliged to him that ſhould convince me of my miſtake in this notion (having hitherto thought I had Reaſon, but I am ſure I have had Experience, to confirm me in a good opinion of it) particularly in relation to *Apoplexies*, as having not been ſo happy, in my reading, to meet with that ſatisfaction; Or ſhall propoſe ſuch other certain remedies, or methods of cure, as would ſuperſede its uſe in this, or other caſes, that I think require it. But I muſt ſubjoyne, that I cannot but much wonder that *Barbette* a Phyſitian of Conſiderable reputation, and whoſe *Praxis* is in the hands of all Phyſitians, ſhould have thoſe ill notions of Phlebotomy, as to reflect upon it, as the cauſe of the miſcarriage of the *Apoplectical* patients, he inſtances in;

when

when both 'tis probable, from what he ſays, there was but very little bloud taken away, and alſo 'tis eaſy to be collected he never durſt try the remedy in its due latitude; but, in complyance to his prejudices, would rather let them dye under a (without this) unpromiſing method, than attempt a cure by it, againſt which (whatever he could) he does not urge any reaſon of moment.

As to the place where Phlebotomy ought to be adminiſtred: though there being a Circulation of the blould, any part of the Body, where a Veine can be readily come at, may be proper enough; ſince the Veſſels being conſiderably emptyed any where, the remaining bloud will, 'tis known, come from all others, eſpecially that where 'tis too much congeſted, to fill them again, and ſo keep up the proportion every where

and

(and the forementioned *Systaltick motion* must whem the *Plethora* is taken off, assist the brisker circulation through parts before distended:) Yet the *Jugular*, if it can be met with, is the most proper Veine for this discharge, since it evacuates immediately only from the head; whereas those of the Limbs, doe it but mediately, as requiring a good quantity to be taken away, before what lyes in the *Brain* can come to be extruded, according to the known laws of Circulation. And this may recommend it self the more to the timorous Assistants; since so 'tis likely the relief will be as the more speedy, so with less expence of bloud.

But besides (but especially after) Phlebotomy, I conceive other remedies ought to be, with all speed, used, as *Vesicatories*, *Cupping glasses*, *Sternutations* or other *Errhines*, *Apo-*

Apophlegmatiſmes, acrimonious Cataplaſmes to the feet and wriſts, *Volatil ſalts* or *Aſſa fœtida*, or the like, in *odour*, and any other Adminiſtrations in order to excite, and make the *Brain* contract it ſelf, to expel the morbid matter, as well as to divert the courſe of it: as alſo that inwardly be given *ſpirit* of *Salarmoniack* or other *Volatil ſalts*, *Caſtor*, and other brisk Nerval remedies, which may ſo irritate, as to cauſe a corroboration of its tone; that ſo the effuſed, or congeſted, matter may come to be extruded, and at laſt reſumed by the veines. To this intent likewiſe, *Vomitories*, and *Purgatives* (of which, as of the reſt, Authors have ſtore, as for the due adminiſtration of them the preſence and judgment of a *Phyſitian* is neceſſary) ought, as occaſion is, to be brought into uſe. And if the diſtemper begin once

once to yeild to the efficacy of these remedies; As I before intimated, so I must again suggest, that corroborating ones should for a long time be insisted on, to restore the *Brain* and the *Nerves* to their pristine tone.

After all give me leave to subjoyne that you may collect a great *Specimen* of my deference to you from hence, that for the satisfaction (which yet I am afraid they'l think not given) of some of your Friends, as you suggest, to whom the *Latin* tongue is not so easy, I publish this (against the advice of some great ones of my own, and those great Judges) in our own Language, when most of the speculations had been (perhaps) as easily, but more fitly delivered in that; and withall, give me leave to say, several of them so much out of the way of those, that understand only the *English* tongue, that few such will,

will, perhaps reliſh them. And indeed though nothing here brought, can be pretended at all inſtructive, either to your ſelf, or other great Phyſitians of this Age (than which none ever enjoyed numbers of them of greater, if equal, abilities) but muſt be looked on as very *jejune*, as being drawn up by one who is ſo very conſcious of his own inabilities, that it may be conſtrued arrogance to appear at all thus publickly; yet ſince I muſt ſo far diſſent from you as to believe, 'tis likely the Diſcourſe may meet with not many Readers but thoſe of the Faculty of Phyſick; who perhaps out of curioſity may give themſelves that trouble; though but to cenſure the compoſer; it ought at leaſt to have been written in the Language in which you are moſt accuſtomed to imploy your ſelves. But I muſt needs ſay the argument you

urge, from the example of the very great Mr. *Boyle*, Dr. *Henshaw*, and several other great, as well Physitians, as Philosophers (not to urge that of former Ages) both of our own, and neighbouring Nations, who have thought fit to write in their own Language) particularly the very learned Dr. *Tho. Burnet*, who has been pleased to oblige his own Nation, by publishing his most curious *Theory*, and that much improved, in its own, after he had done it first in *Latin*) has enough in it to plead my excuse to those who advise the contrary.

But indeed there may be one reason of moment, I conceive, alledged, why 'tis fitting somthing should be written in the language of each country concerning this, more than any other, Disease; *viz.* because this, of all, requires the speediest relief: and

Physitians

Phyſitians not being always at hand, Charity obliges that all ſhould have ſuch remedies made known to them as may put a ſtop to the danger, till farther help can be had. And *Phlebotomy* being that great, and almoſt certain, (not to ſay only) one, when there is any hope of recovery; as 'tis fitting the generality of people ſhould be convinced of it, as well as their danger without it (though indeed it may be ſuſpected, ſo great are the prejudices moſt have, not very many will) and therefore, if any be ſeyzed, others ſhould have immediate recourſe to it for them, without ſtaying for a *Phyſitian*; ſo it may be ſome farther *Apology* for my adventuring to gratify you, ſince no Body elſe, that I know of, has in Engliſh written *ex profeſſo* of it ſingly; at leaſt with thoſe convictions, which I have upon me, of the neceſſity of *this Remedy*.

How-

However I must herein own your friendship; that since you will have me write, you would have me do it with that advantage to my reputation, not to expose my weakness, by attempting it in the Learned Language; wherein you must be conscious, from former instances, how much I am deficient. If any of my notions, here delivered, suit not with yours, I expect, in return, your sense upon them; which, If convincing to my understanding, shall be gratefully acknowledged, and subscribed to, by, *Sir*,

Your most Faithfull
Friend, and Servant

Worceſter,
Aug. 20. 1688.

WILLIAM COLE.

ERRATA.

Pag. 43. *line* 17. for Excraſie, *read* Exerciſe. *p.* 76. *l.* 1. *r.* we may. *p.* 129. *l.* 10. *r.* may from. *p.* 142. *l.* 3. *r.* Sweats. *p.* 151. *ult. r.* abſumption. *p.* 170. *l.* 4. after Brain, *r.* ſeems farther about: and I ſuppoſe 'twill be allowed that the Brain.

FINIS.

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